ESCUELA SUPERIOR POLITECNICA DEL LITORAL

Administracíon de Operaciones
Examen Final
Term. II, 2017

1.) The Stone River Textile Mill was inspected and found to be in violation of a number of safety regulations. The inspectors ordered the mill to alter some existing machinery to make it safer; purchase some new machinery to replace the older, dangerous machinery; and relocate some machinery to make safer passages and unobstructed entrances and exits. The inspectors gave the mill 35 weeks to make the changes; if the changes are not made by then, the mill will be fined $300,000.

The mill determined the activities in a PERT network that would have to be completed and then estimated the indicated activity times, as shown in the table. Construct the PERT network for this project and determine the following:

a.) expected activity times

b.) earliest start, earliest finish, latest start, latest finish times as well as slack for all activities.

c.) Critical Path

d.) Expected Project duration and variance

e.) The probability that the mill will be fined $300,000

| | | | Time Estimates (Weeks) | | |
Activity	Description	Activity Predecessor	a	m	b
A	Order new machinery	---	1	2	3
B	Plan new physical layout	---	2	5	8
C	Determine safety changes in existing machinery	---	1	3	5
D	Receive equipment	A	4	10	25
E	Hire new employees	A	3	7	12
F	Make plant alterations	B	10	15	25
G	Make changes in existing machinery	C	5	9	14
H	Train new employees	D, E	2	3	7
I	Install new machinery	D,E,F	1	4	6
J	Relocate old machinery	D,E,F,G	2	5	10
K	Conduct employee safety orientation	H,I,J	2	2	2

2.) Play Bricks is a classic toy made from reinforced cardboard. A 24-inch slab of cardboard is cut from a 4-foot sheet (that means that 1 sheet makes 2 slabs), trimmed and scored (to be folded later by the customer, and coated with 2 ounces of wax. One coated slab is used for the front of the brick and one coated slab is used for the back of the brick. Front sides require about 2 ounces of paint; back sides are unpainted. The front and back are pressure-glued together to make one complete (but unassembled) brick. Twenty unassembled bricks are packaged to a box. The wax and paint are purchased in gallon containers and take about 2 days to get from the supplier. The box is special ordered with a lead time of 5 days. All other processes require a 1-day lead time. (Note: There are 128 ounces in a gallon)

a.) Create a material structure tree for Play Bricks.

b.) Assuming no stock on hand, plan the purchase and work orders necessary to produce 50 boxes of Play Bricks by period 7. That is, create a net material requirements plan.

Labels	1	2	3	4	5	6	7	Lead Time

Normal Table

	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.50000	.50399	.50798	.51197	.51595	.51994	.52392	.52790	.53188	.53586
0.1	.53983	.54380	.54776	.55172	.55567	.55962	.56356	.56749	.57142	.57535
0.2	.57926	.58317	.58706	.59095	.59483	.59871	.60257	.60642	.61026	.61409
0.3	.61791	.62172	.62552	.62930	.63307	.63683	.64058	.64431	.64803	.65173
0.4	.65542	.65910	.66276	.66640	.67003	.67364	.67724	.68082	.68439	.68793
0.5	.69146	.69497	.69847	.70194	.70540	.70884	.71226	.71566	.71904	.72240
0.6	.72575	.72907	.73237	.73536	.73891	.74215	.74537	.74857	.75175	.75490
0.7	.75804	.76115	.76424	.76730	.77035	.77337	.77637	.77935	.78230	.78524
0.8	.78814	.79103	.79389	.79673	.79955	.80234	.80511	.80785	.81057	.81327
0.9	.81594	.81859	.82121	.82381	.82639	.82894	.83147	.83398	.83646	.83891
1.0	.84134	.84375	.84614	.84849	.85083	.85314	.85543	.85769	.85993	.86214
1.1	.86433	.86650	.86864	.87076	.87286	.87493	.87698	.87900	.88100	.88298
1.2	.88493	.88686	.88877	.89065	.89251	.89435	.89617	.89796	.89973	.90147
1.3	.90320	.90490	.90658	.90824	.90988	.91149	.91309	.91466	.91621	.91774
1.4	.91924	.92073	.92220	.92364	.92507	.92647	.92785	.92922	.93056	.93189
1.5	.93319	.93448	.93574	.93699	.93822	.93943	.94062	.94179	.94295	.94408
1.6	.94520	.94630	.94738	.94845	.94950	.95053	.95154	.95254	.95352	.95449
1.7	.95543	.95637	.95728	.95818	.95907	.95994	.96080	.96164	.96246	.96327
1.8	.96407	.96485	.96562	.96638	.96712	.96784	.96856	.96926	.96995	.97062
1.9	.97128	.97193	.97257	.97320	.97381	.97441	.97500	.97558	.97615	.97670
2.0	.97725	.97784	.97831	.97882	.97932	.97982	.98030	.98077	.98124	.98169
2.1	.98214	.98257	.98300	.98341	.98382	.98422	.98461	.98500	.98537	.98574
2.2	.98610	.98645	.98679	.98713	.98745	.98778	.98809	.98840	.98870	.98899
2.3	.98928	.98956	.98983	.99010	.99036	.99061	.99086	.99111	.99134	.99158
2.4	.99180	.99202	.99224	.99245	.99266	.99286	.99305	.99324	.99343	.99361
2.5	.99379	.99396	.99413	.99430	.99446	.99461	.99477	.99492	.99506	.99520
2.6	.99534	.99547	.99560	.99573	.99585	.99598	.99609	.99621	.99632	.99643
2.7	.99653	.99664	.99674	.99683	.99693	.99702	.99711	.99720	.99728	.99736
2.8	.99744	.99752	.99760	.99767	.99774	.99781	.99788	.99795	.99801	.99807
2.9	.99813	.99819	.99825	.99831	.99836	.99841	.99846	.99851	.99856	.99861
3.0	.99865	.99869	.99874	.99878	.99882	.99886	.99889	.99893	.99896	.99900
3.1	.99903	.99906	.99910	.99913	.99916	.99918	.99921	.99924	.99926	.99929
3.2	.99931	.99934	.99936	.99938	.99940	.99942	.99944	.99946	.99948	.99950