

1. Explain shortly (á 2 points = max 10 points)

- i. Disadvantages of globalization
- ii. Major process decisions
- iii. Vertical integration
- iv. Data Analysis Tools
- v. Dominant factors in manufacturing

2. When making a business plan for wood product industry you have to make several studies. i) Explain shortly what kind of studies would you include in your business plan ii) Explain in more detail how would you make a raw material study.

3. What are the five process types for manufacturing? (2 p) What is the relationship between volume and process decisions for manufacturing operations? (2 p) Give an example in the wood product industry! (3 p) (Maximum of 7 points)

4. The approach to designing a layout depends on whether a process layout or a product layout has been chosen. What are these layouts and when you use them? How and why would you create hybrid layout? (Maximum of 6 points)

5. Consider the following data for a project. (á 2 points = max 6 points)

Activity	Activity time (Weeks)	Immediate predecessor(s)
A	2	-
B	4	A
C	5	A
D	2	B
E	1	B
F	8	B, C
G	3	D, E
H	5	F
I	4	F
J	7	G, H, I

- a. Draw the network diagram for this project.
- b. Calculate the critical path for this project
- c. How much total slack is in activities G, H and I.

6. The cash flow projections of salad bar project are shown in the following table. Management wants to earn a return of at least 14 percent on its investment. Estimate the NPV, IRR, and payback period. You may use the table B.1. Should management make this investment? (Maximum of 10 points)



Puu-28.4020 Production investment planning Exam 7.5.2009

ITEM	YEAR						
	2001	2002	2003	2004	2005	2006	2007
Initial information							
Annual demand (salads)		11,000	11,000	11,000	11,000	11,000	
Investment	\$16,000						
Interest (discount) rate	0.14						
Cash Flows							
Revenue		\$38,500	\$38,500	\$38,500	\$38,500	\$38,500	
Expenses: Variable costs		22,000	22,000	22,000	22,000	22,000	
Expenses: Fixed costs		8,000	8,000	8,000	8,000	8,000	
Depreciation (D)		3,200	5,120	3,072	1,843	1,843	922
Pretax income		\$5,300	\$3,380	\$5,428	\$6,657	\$6,657	-\$922
Taxes (40%)		2,120	1,352	2,171	2,663	2,663	-389
Net operating Income (NOI)		\$3,180	\$2,208	\$3,257	\$3,994	\$3,994	-\$553
Total cash flow (NOI + D)		\$6,380	\$7,148	\$6,329	\$5,837	\$5,837	\$389

TABLE B.1

Present Value Factors for a Single Payment

Number of Periods (n)	Interest Rate (r)																		
	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.10	0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.28	0.30	
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9258	0.9091	0.8929	0.8772	0.8621	0.8475	0.8333	0.8197	0.8065	0.7937	0.7812	0.7692	
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8573	0.8264	0.7972	0.7695	0.7432	0.7182	0.6944	0.6719	0.6504	0.6298	0.6104	0.5917	
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.7938	0.7513	0.7118	0.6750	0.6407	0.6086	0.5787	0.5507	0.5245	0.4999	0.4769	0.4552	
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7350	0.6830	0.6355	0.5921	0.5523	0.5158	0.4823	0.4514	0.4230	0.3968	0.3725	0.3501	
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.6806	0.6209	0.5674	0.5194	0.4761	0.4371	0.4019	0.3700	0.3411	0.3149	0.2910	0.2693	
6	0.9420	0.8880	0.8375	0.7903	0.7462	0.7050	0.6302	0.5645	0.5066	0.4556	0.4104	0.3704	0.3349	0.3033	0.2751	0.2499	0.2274	0.2072	
7	0.9327	0.8706	0.8131	0.7598	0.7107	0.6651	0.5835	0.5132	0.4523	0.3996	0.3538	0.3139	0.2791	0.2486	0.2218	0.1983	0.1776	0.1594	
8	0.9235	0.8535	0.7894	0.7307	0.6768	0.6274	0.5403	0.4695	0.4039	0.3506	0.3050	0.2660	0.2326	0.2038	0.1789	0.1574	0.1388	0.1226	
9	0.9143	0.8368	0.7664	0.7028	0.6446	0.5919	0.5002	0.4241	0.3606	0.3075	0.2630	0.2255	0.1938	0.1670	0.1443	0.1249	0.1084	0.0943	
10	0.9053	0.8203	0.7441	0.6759	0.6139	0.5594	0.4632	0.3855	0.3220	0.2697	0.2267	0.1911	0.1615	0.1369	0.1164	0.0922	0.0847	0.0725	
11	0.8963	0.8043	0.7224	0.6496	0.5847	0.5268	0.4288	0.3505	0.2875	0.2366	0.1954	0.1619	0.1346	0.1122	0.0938	0.0787	0.0662	0.0559	
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.3971	0.3188	0.2567	0.2076	0.1685	0.1372	0.1122	0.0920	0.0757	0.0625	0.0517	0.0429	
13	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.3677	0.2897	0.2282	0.1821	0.1452	0.1163	0.0935	0.0754	0.0610	0.0496	0.0404	0.0330	
14	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3405	0.2633	0.2046	0.1597	0.1252	0.0985	0.0779	0.0618	0.0482	0.0383	0.0316	0.0254	
15	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3152	0.2394	0.1827	0.1401	0.1079	0.0835	0.0649	0.0507	0.0397	0.0312	0.0247	0.0195	
16	0.8528	0.7284	0.6232	0.5339	0.4591	0.3936	0.2919	0.2176	0.1631	0.1229	0.0930	0.0708	0.0541	0.0415	0.0320	0.0248	0.0193	0.0150	
17	0.8444	0.7142	0.6050	0.5134	0.4363	0.3714	0.2703	0.1978	0.1456	0.1078	0.0802	0.0600	0.0451	0.0340	0.0258	0.0197	0.0150	0.0116	
18	0.8360	0.7002	0.5874	0.4936	0.4155	0.3503	0.2502	0.1798	0.1300	0.0946	0.0691	0.0508	0.0376	0.0278	0.0208	0.0156	0.0118	0.0089	
19	0.8277	0.6864	0.5703	0.4746	0.3957	0.3305	0.2317	0.1635	0.1161	0.0829	0.0636	0.0431	0.0313	0.0229	0.0168	0.0124	0.0092	0.0068	
20	0.8195	0.6730	0.5537	0.4564	0.3769	0.3118	0.2145	0.1486	0.1037	0.0729	0.0514	0.0365	0.0261	0.0187	0.0136	0.0098	0.0072	0.0053	
21	0.8114	0.6598	0.5375	0.4389	0.3589	0.2942	0.1987	0.1351	0.0926	0.0638	0.0443	0.0309	0.0217	0.0154	0.0109	0.0078	0.0058	0.0040	
22	0.8034	0.6468	0.5219	0.4220	0.3418	0.2775	0.1839	0.1228	0.0826	0.0560	0.0382	0.0262	0.0181	0.0126	0.0088	0.0062	0.0044	0.0031	
23	0.7954	0.6342	0.5067	0.4057	0.3255	0.2618	0.1703	0.1117	0.0738	0.0491	0.0329	0.0222	0.0151	0.0103	0.0071	0.0049	0.0034	0.0024	
24	0.7876	0.6217	0.4919	0.3901	0.3101	0.2470	0.1577	0.1015	0.0659	0.0431	0.0284	0.0188	0.0128	0.0085	0.0057	0.0039	0.0027	0.0018	
25	0.7798	0.6095	0.4776	0.3751	0.2953	0.2330	0.1460	0.0923	0.0588	0.0378	0.0245	0.0160	0.0105	0.0069	0.0046	0.0031	0.0021	0.0014	
26	0.7720	0.5978	0.4637	0.3607	0.2812	0.2198	0.1352	0.0839	0.0525	0.0331	0.0211	0.0135	0.0087	0.0057	0.0037	0.0025	0.0016	0.0011	
27	0.7644	0.5899	0.4532	0.3498	0.2708	0.2074	0.1252	0.0763	0.0469	0.0291	0.0182	0.0115	0.0073	0.0047	0.0030	0.0019	0.0013	0.0008	
28	0.7568	0.5744	0.4371	0.3335	0.2551	0.1956	0.1159	0.0699	0.0419	0.0255	0.0157	0.0097	0.0061	0.0038	0.0024	0.0015	0.0010	0.0006	
29	0.7493	0.5631	0.4243	0.3207	0.2429	0.1846	0.1073	0.0630	0.0374	0.0224	0.0135	0.0082	0.0051	0.0031	0.0020	0.0012	0.0008	0.0005	
30	0.7419	0.5521	0.4120	0.3083	0.2314	0.1741	0.0994	0.0573	0.0334	0.0196	0.0116	0.0070	0.0042	0.0026	0.0016	0.0010	0.0006	0.0004	
35	0.7059	0.5000	0.3554	0.2534	0.1813	0.1301	0.0676	0.0356	0.0189	0.0102	0.0055	0.0030	0.0017	0.0009	0.0005	0.0003	0.0002	0.0001	
40	0.6717	0.4529	0.3066	0.2083	0.1420	0.0972	0.0460	0.0221	0.0107	0.0053	0.0026	0.0013	0.0007	0.0004	0.0002	0.0001	0.0001	0.0000	

$$P = \frac{F}{(1+r)^n} = F(pf)$$

where
 P = present value of a single investment
 F = future value of a single payment
 n = number of periods for which P is to be invested
 r = periodic interest rate
 pf = present value factor for \$1 = 1/(1+r)^n