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Wood Technology

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

i. Environmental impact analysis
ii. Plan – Do – Check – Act Cycle
iii. Vertical integration
iv. Data Analysis Tools
v. Dominant factors in manufacturing

2. Multiple choices. Answer only a, b, c or d (a right answer + 1 p, a wrong answer -1 p = max 5 points)

i. The finance function influences operating decisions about:
   a. Investment in new technology
   b. Layout redesign
   c. Capacity expansion
   d. All of the above

ii. The Nail & Screw Co. has determined that their fixed and variable costs for producing a highly used fastener are $750.00 and $0.035, respectively. The purchasing department has identified an outsourcing partner with costs to Nail & Screw of $200.00 and $0.05, respectively. What is the break-even point for the make or buy decision if the unit packaging is for 1000 pieces?
   a. 22
   b. 50
   c. 37
   d. none of the above

iii. Technologies reflect what people are working on and what they are using to do work. Which of the following is not a typical classification of technology?
   a. product technology
   b. information technology
   c. exotic technology
   d. process technology

iv. Which of the factors below might be a potential disadvantage of on-site expansion?
   a. onset of diseconomies of scale
   b. hiring of new labor
   c. reduced construction time and cost
   d. keeping management together

v. Under ideal conditions, a window frame manufacturing facility can produce 480 frames per day. Under normal conditions, the company schedules 135 frames per day. Current market conditions and production strategy have combined to limit production to 120 frames per day. What is the approximate utilization relative to effective capacity?
   a. 25%
   b. 75%
   c. 89%
   d. 112%

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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 weather 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)

	YEAR						
ITEM	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	−369
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	$369

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TABLE B.1

Present Value Factors for a Single Payment

Number of Periods	Interest Rate (r)																	
(n)	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	0.9259	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	0.6299	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	0.4768	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	0.7599	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	0.4665	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	0.7026	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	0.6756	0.6139	0.5584	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	0.4289	0.3505	0.2875	0.2366	0.1954	0.1619	0.1346	0.1122	0.0938	0.0787	0.0662	0.0558
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.3971	0.3186	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	0.2292	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	0.0492	0.0393	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	0.4581	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	0.1799	0.1300	0.0946	0.0691	0.0508	0.0376	0.0279	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	0.0596	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	0.0728	0.0514	0.0365	0.0261	0.0187	0.0135	0.0098	0.0072	0.0053
21	0.8114	0.6598	0.5375	0.4388	0.3589	0.2942	0.1987	0.1351	0.0926	0.0638	0.0443	0.0309	0.0217	0.0154	0.0109	0.0078	0.0056	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	0.3256	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	0.0126	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	0.5976	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	0.5859	0.4502	0.3468	0.2678	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	0.0693	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 = $1/(1+r)^n$