1　(20%)

Marshall University offers high-tech graduate-level programs. Marshall has two principal operating departments, Commerce and Social Sciences, and two support departments, Facility and Technology (F&T) Maintenance and Enrollment Services. The base used to allocate Facility and Technology Maintenance is budgeted total maintenance hours. The base used to allocate enrollment services is number of credit hours for a department. The Facility and Technology Maintenance budget is $500,000, while the Enrollment Services budget is $900,000. The following chart summarizes budgeted amounts and allocation-base amounts used by each department:

| | Services Provided (Annually) | | | | |
	Budget	Commerce	Social Sciences	F&T Maintenance	Enrollment Service
F&T Maintenance (in hours)	$500,000	3,000	6,000	Zero	5,000
Enrollment Service (in credit hours)	$900,000	25,000	35,000	2,000	Zero

Required:

Marshall University uses the step-down method with the sequence of allocation based on the highest-percentage support concept.

1.1　Compute the total amount of support costs allocated to Commerce Department.

1.2　Compute the total amount of support costs allocated to Social Sciences Department.

2　(20%)

ABC Boat Company is interested in replacing a molding machine with a new improved model. The old machine has a salvage value of $10,000 now and a predicted salvage value of $4,000 in six years, if rebuilt. If the old machine is kept, it must be rebuilt in one year at a predicted cost of $20,000.

The new machine costs $80,000 and has a predicted salvage value of $12,000 at the end of six years. If purchased, the new machine will allow cash savings of $20,000 for each year of the first three years, and $10,000 for each year of its remaining six-year life.

Required:

2.1　What is the net cash flow of purchasing the new machine?

2.2　What is the net present value of purchasing the new machine if the company has a required rate of return of 14%?

3　(20%)

Lewis Auto Company manufactures a part for use in its production of automobiles. When 10,000 items are produced, the costs per unit are:

Direct materials	$ 12
Direct manufacturing labor	60
Variable manufacturing overhead	24
Fixed manufacturing overhead	32
Total	$128

Monty Company has offered to sell Lewis Auto Company 10,000 units of the part for $120 per unit. The plant facilities could be used to manufacture another part at a savings of $180,000 if Lewis Auto accepts the supplier's offer. In addition, $20 per unit of fixed manufacturing overhead on the original part would be eliminated.

Required:

3.1　What is the relevant per unit cost for the original part?

3.2　Which alternative is best for Lewis Auto Company? By how much?

4　(40%)

Weather Instruments assembles products from component parts. It has two departments that process all products. During January, the beginning work in process in the assembly department was half complete as to conversion and complete as to direct materials. The beginning inventory included $12,000 for materials and $4,000 for conversion costs. Overhead is applied at the rate of 50% of direct manufacturing labor costs. Ending work-in-process inventory in the assembly department was 40% complete. All spoilage is considered normal and is detected at the end of the process.

Beginning work in process in the finishing department was 75% complete as to conversion and ending work in process was 25% converted. Direct materials are added at the end of the process. Beginning inventories included $16,000 for transferred-in costs and $10,000 for direct manufacturing labor costs. Overhead in this department is equal to direct manufacturing labor costs. Additional information about the two departments follows:

	Assembly	Finishing
Beginning work-in-process units	20,000	24,000
Units started this period	40,000	?
Units transferred this period	50,000	54,000
Ending work-in-process units	8,000	20,000
Material costs added	$44,000	$28,000
Direct manufacturing labor	$16,000	$24,000

Assume that weighted-average method is used by assembly department and FIFO is used by the finishing department.

Required:

1.　In the assembly department, what is the total costs transferred out?

2.　In the assembly department, what is the ending work in process?

3.　In the finishing department, what is the total costs transferred out?

4.　In the finishing department, what is the ending work in process?

PRESENT VALUE TABLE

Present value of $1, that is $(1+r)^{-n}$ where r = interest rate; n = number of periods until payment or receipt.

Periods (n)	Interest rates (r)									
	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.079	0.065
16	0.188	0.163	0.141	0.123	0.107	0.093	0.081	0.071	0.062	0.054
17	0.170	0.146	0.125	0.108	0.093	0.080	0.069	0.060	0.052	0.045
18	0.153	0.130	0.111	0.095	0.081	0.069	0.059	0.051	0.044	0.038
19	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043	0.037	0.031
20	0.124	0.104	0.087	0.073	0.061	0.051	0.043	0.037	0.031	0.026

Cumulative present value of $1 per annum, Receivable or Payable at the end of each year for n years $\frac{1-(1+r)^{-n}}{r}$

Periods (n)	Interest rates (r)									
	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192
11	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	7.793	4.611	4.439
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675
16	7.379	6.974	6.604	6.265	5.954	5.668	5.405	5.162	4.938	4.730
17	7.549	7.120	6.729	6.373	6.047	5.749	5.475	5.222	4.990	4.775
18	7.702	7.250	6.840	6.467	6.128	5.818	5.534	5.273	5.033	4.812
19	7.839	7.366	6.938	6.550	6.198	5.877	5.584	5.316	5.070	4.843
20	7.963	7.469	7.025	6.623	6.259	5.929	5.628	5.353	5.101	4.870