ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING

Semester Final Examination — Summer Semester, A.Y. 2022-2023
Course No. IPE 4439 — Time : 3 hours
Course Title: Principles of Economics and Cost Accounting — Full Marks: 150

There are **6** (Six) Questions. Answer all the questions. Marks of each question and the corresponding CO and PO are written in the brackets.

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1. a) ABC company recorded the following transactions for a just-completed month. The company had no beginning inventories: (18) (CO1) (PO1)

   I. Raw materials worth $75,000 was purchased.
   II. Raw materials was requisitioned for use in production $73,000. Of this amount, $67,000 was for direct materials and the remainder was for indirect materials.
   III. Total wages of $152,000 were incurred and paid. Of this amount, $134,000 was for direct labour and the remainder was for indirect labour.
   IV. Additional manufacturing overhead costs of $126,000 were incurred and paid.
   V. Manufacturing overhead costs of $178,000 were applied to jobs using the company's pre-determined overhead rate.
   VI. All of the jobs in process at the end of the month were completed and shipped to customers.
   VII. If overhead is underapplied in the period, it is closed out to cost of goods sold. If overhead is overapplied in the period, it is allocated among appropriate accounts on the basis of the cost of manufacturing in each account.

   Required:
   i. Prepare the journal entry for the above transactions.
   ii. Post the above transactions to T-accounts.
   iii. Determine the cost of goods sold for the period.

   b) In March, 2023 AB Limited had sales of $250,000 (50,000 units), total variable expenses of $190,000, and total fixed expenses of $36,000. (07) (CO1) (PO1)

   Required:
   i. What is the company's contribution margin (CM) ratio?
   ii. Using the CM ratio, calculate the break-even level of sales in dollars.
   iii. Estimate the change in the company's operating income if it increased its total sales by $20,000.

2. a) XYZ Company produces a high-quality insulation material that passes through two production processes. Data for November for the first process follow: (20) (CO2) (PO2)

	Units	Completion with Respect to Materials	Completion with Respect to Conversion
Work in process inventory, November 1	80,000	50%	25%
Work in process inventory, November 30	60,000	45%	20%

Materials cost in work in process inventory, November 1	$76,600
Conversion cost in work in process inventory, November 1	$34,900
Units started into production	300,000
Units transferred to the next process	320,000
Materials cost added during November	$410,000
Conversion cost added during November	$234,500

Required:

i. Assume that the company uses the weighted-average method of accounting for units and costs. Determine the equivalent units for November for the first process.

i. Compute the costs per equivalent unit for November for the first process.

ii. Determine the total cost of ending work in process inventory and the total cost of units

b) Distinguish between job order and process order costing. (05) (CO2) (PO2)

3. a) Hart Company sells and delivers office furniture across Western Canada. The costs associated with the acquisition and annual operation of a delivery truck are given below: (20) (CO3) (PO11)

Insurance	$ 1,750
Licences	$ 250
Taxes (vehicle)	$ 150
Garage rent for parking (per truck)	$ 1,350
Depreciation ($30,000 ÷ 5 years)	$6,000
Gasoline, oil, tires, and repairs	$0.16/km

Required:

i. Assume that Hart Company owns one truck that has been driven 50,000 kilometres during the first year. Compute the average cost per kilometre of owning and operating the truck.

ii. At the beginning of the second year, Hart Company is unsure whether to use the truck or leave it parked in the garage and have all hauling done commercially. (The government requires the payment of vehicle taxes even if the vehicle isn't used.) What costs from the previous list are relevant to this decision? Explain.

iii. Assume that the company decides to use the truck during the second year. Near year-end, an order is received from a customer over 1,000 kilometres away. What costs from the previous list are relevant in a decision between using the truck to make the delivery and having the delivery done commercially? Explain.

iv. Occasionally, the company could use two trucks at the same time. For this reason, some thought is being given to purchasing a second truck. The total kilometres driven would be the same as if only one truck were owned. What costs from the previous list are relevant to a decision about whether to purchase the second truck? Explain.

b) WV Limited produces several products from processing krypton, a rare mineral. Material and processing costs total $30,000 per ton; one-third of the costs are allocated to the product Castingard. The Castingard produced from a ton of krypton can be either sold at the split-off point or processed further at a cost of $13,000 and then sold for $60,000. The sales value of Castingard at the split-off point is $50,000. **Required:** Should Castingard be processed further or sold at the split-off point? (05) (CO3) (PO11)

4. XYZ manufactures a small personal water tube used for children learning to swim. Management is now preparing detailed budgets for the third quarter, July through September, and has assembled the following information to assist: (25) (CO2) (PO2)

I. The selling price of the water tubes is $60. The Marketing Department has estimated sales as follows for the remainder of the year (number of water tubes):

July	.....	6,500	October	.....	3,000
August	.....	5,000	November	.....	2,500
September	.....	4,000	December	.....	2,000

II. All sales are on account. Based on past experience, sales are expected to be collected in the following pattern:
- 50% in the month of sale
- 45% in the month following sale
- 5% uncollectible

The beginning accounts receivable balance (excluding uncollectible amounts) on July 1 will be $160,000.

III. The company maintains finished goods inventories equal to 20% of the following month's sales. The inventory of finished goods on July 1 will be 1,300 units.

IV. Each water tube requires 3 kilograms of synthetic polyisoprene rubber compound. To prevent shortages, the company would like the inventory of synthetic rubber compound on hand at the end of each month to be equal to 20% of the following month's production needs. The inventory of synthetic rubber compound on hand on July 1 will be 3,720 kilograms.

V. The synthetic rubber compound costs $3.50 per kilogram. Water Sport pays for 70% of its purchases in the month of purchase; the remainder is paid for in the following month. The accounts payable balance for synthetic rubber compound purchases will be $11,400 on July 1.

Required:

i. Prepare a sales budget, by month and in total, for the third quarter. (Show your budget in both units of water tubes and dollars.) Also prepare a schedule of expected cash collections, by month and in total, for the third quarter.

ii. Prepare a production budget for each of the months July through October.

iii. Prepare a direct materials purchases budget for synthetic rubber compound, by month and in total, for the third quarter. Also prepare a schedule of expected cash disbursements for synthetic rubber compound, by month and in total, for the third quarter.

5. a) At the XY Company's current activity level of 8,000 units per month, the costs of producing and selling one unit of the company's only product are as follows: (15) (CO3) (PO11)

Direct materials	$2.50
Direct labour	$3.00

Variable manufacturing overhead	$0.50
Fixed manufacturing overhead	$4.25
Variable selling and administrative expenses	$1.50
Fixed selling and administrative expenses	$2.00

The normal selling price is $15 per unit. The company's capacity is 10,000 units per month. An order has been received from a potential customer overseas for 2,000 units at a price of $12.00 per unit. This order would not affect regular sales.

Required:

i. If the order is accepted, by how much will monthly profits increase or decrease? (The order would not change the company's total fixed costs.)

ii. Assume the company has 500 units of this product left over from last year that are inferior to the current model. The units must be sold through regular channels at reduced prices. What unit cost is relevant for establishing a minimum selling price for these units? Explain.

b) BC Co. makes motorized scooters for city commuters. The scooters can be charged using a regular household plug, and the batteries hold their charge for 24 hours. The manufacturing plant is currently operating at 70% capacity. The plant manager is considering manufacturing headlights for the scooters, which are currently being produced by an outside company and purchased by BC for $11 each. Electric Scooter has the equipment and the workforce to produce the headlights. The engineers have suggested a variable cost of $3 in direct labour and $4 in direct materials. The plant overhead rate is 200% of direct labour dollars, and 40% of the overhead is fixed cost. (10) (CO3) (PO11)

Required:

Should Electric Scooter make the headlights in-house?

6. a) YZ Company is considering replacing an old threading machine. A new threading machine is available that could substantially reduce annual operating costs. Selected data relating to the old and new machines are presented below: (15) (CO3) (PO11)

	Old Machine	**New Machine**
Purchase cost when new	$200,000	$250,000
Salvage value now	30,000	0
Annual cash operating costs	150,000	90,000
Overhaul needed immediately	40,000	0
Salvage value in six years	0	50,000
Remaining life	6 years	6 years

Should the company buy the new machine? Use total-cost approach (least-cost decision)

b) Z Industries is investigating purchasing automated equipment that would save $100,000 each year in direct labour and inventory carrying costs. This equipment costs $750,000 and is expected to have a 10-year useful life with $50,000 salvage value. The company requires a minimum 15% rate of return on all equipment purchases. This equipment would provide intangible benefits (such as greater flexibility and higher-quality output) that are difficult to estimate and yet are quite significant. (10) (CO3) (PO11)

Required:

Ignore income taxes. What dollar value per year would the intangible benefits have to be worth to make the equipment an acceptable investment?