Question 1: Financial Markets (15 marks)

i) Describe the **four** primary functions of financial markets. (8 marks)

1. *Aggregate and centralize buyers and sellers of financial assets to facilitate price formation.*
2. *Provides a mechanism for investors to sell a financial asset.*
3. *Reduces search and information costs of transacting in financial assets.*
4. *Create small denomination or aggregated instruments.*

2 marks each

ii) If there were no asymmetry in the information between a borrower and a lender, could there still be a moral hazard problem? (7 marks)

In your response define the terms moral hazard and information asymmetry and also respond to the posed question.

Information asymmetry in the context of financial markets refers to the situation when buyers and sellers of a financial instrument have different information sets which they utilize to estimate asset value.

Moral hazard is the risk that the party which receives and allocates the invested funds acts in a manner which creates personal benefits which are contrary to the intent of the investment agreement and are detrimental to its outcome.

Moral hazard problems arise due to information asymmetries after the investment is made. In the absence of information asymmetry between the borrower and lender there can be no moral hazard problem.

Question 2: Mortgage / Financing (7 marks)

You have just purchased a $42,000 car. You have financed your purchase with a down payment of $12,000 and a $30,000 bank loan at an interest rate of 5% compounded annually. The car loan is to be amortized (paid back) over 5 years. Payments are to be made on a monthly basis (at the end of each month). The first payment will be one month from today.

i.   Calculate the monthly payment on the car loan. (3 marks)

$$EMR = (1.05)^{1/12} - 1 = 0.0040074 \quad \textcircled{1}$$

$$30,000 = \frac{C}{0.0040074}\left[1 - \frac{1}{(1.0040074)^{60}}\right] \quad \textcircled{2}$$

$$C = \$564.61$$

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ii.   Calculate the interest portion and the principal portion of the 20th payment. To do this, calculate the principle remaining after the 19th payment, the interest component of the payment can be calculated using this value and the interest rate. (4 marks)

Principle

~~payment~~ remaining after 19 payments (60 - 19 = 41 payments remain) $\textcircled{1}$

$$PV_{19} = \frac{564.61}{0.0040074}\left[1 - \frac{1}{(1.0040074)^{41}}\right] \quad \textcircled{2}$$

$$= \$21,279.1699$$

interest portion of 20th payment $= \$21,279.1699 \times 0.0040074$

$= \$86.69 \quad \textcircled{0.5}$

principle payment $= 564.61 - 86.69 = \$477.92 \quad \textcircled{0.5}$

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Question 3: Interest Bearing Assets (9 marks)

Describe and explain the **three** factors discussed in class which contributed to the Greek Debt Crisis.

1. Deteriorating Greek Fundamentals
    *   Greece has been living beyond its means for too long
    *   Since entering the EU, Greece has consistently run a deficit (spending more on social programs than it collected via tax revenue), ran a negative balance of payments and realized significant escalations in unemployment
    *   Contracting GDP
    *   Questionable tax collection ability aggravated this situation
    *   High inflation limiting competitiveness abroad (reflected in BOP)
    *   Questionable accounting practices which suggested, at best, Greece was struggling to keep track of its spending

2. Lack of Political Will to correct spending imbalances
    *   Greek fundamentals were correctly being assessed as being inconsistent with long-term membership of Greek membership in the EU
    *   Apparent unwillingness of Greek authorities to undertake necessary reforms
    *   Electorate also largely unwilling to accept reductions in social programs necessary to reverse escalation in debt levels
    *   Cost of Greece exiting the EU priced into borrowing cost

3. Implicit Guarantee from other EU member states, primarily Germany and France
    *   Investors assumed that if Greece was unable to make debit payments, Germany and other EU states would come to their aid as the cost of a Greek exit to other EU members was very high.
    *   This implicit guarantee meant Greek borrowing costs reflected German willingness to come to Greece's aid, as opposed to Greek fundamentals, allowing Greece to borrow at artificially low rates.
    *   If Greece were to exit the EU, there would be no incentive for Germany to continue aid
    *   As the likelihood of a Greek exit escalates or the willingness of Greece to accept the austerity terms of German monetary support waivers, Greece's borrowing costs escalate.

Question 4: Capital Budgeting (12 marks)

You own a company which manufactures propane barbecues. You are debating expanding your current operations to increase production which would allow you to accept Walmart as a customer for the next three years. Sales last year were $1,000,000 based on 5,000 units and the planned expansion would double current production, but Walmart would pay 20% less for its barbecues than your other customers. The expansion will increase fixed costs by $15,000 per year and variable costs will be 35% of sales. In order to increase production, you will buy a second set of manufacturing equipment, which costs $300,000 and would have a salvage value in three years of $40,000. Expanding your facility would correspondingly increase your spare part inventory by $20,000 and payables and receivables are typically 10% of variables costs and sales, respectively. The project will have no effect on cash. Assuming a corporate tax rate of 30%, a CCA rate for the production equipment of 40% and a cost of capital for the firm of 10%, what is the NPV of the proposed expansion of the production facility?

	0	1	2	3	
Sales		800,000	800,000	800,000	①
Fixed Costs		(15,000)	(15,000)	(15,000)	①
Var. Costs		(280,000)	(280,000)	(280,000)	①
Gross income		505,000	505,000	505,000	
Tax (30%)		(151,500)	(151,500)	(151,500)	①
Net income		354,000	354,000	354,000	
Cap. Ex	(300,000) ①			40,000	①
Δ NWC	(20,000)	(52,000)	0	0	
NWC recap.				72,000	①
CF	(320,000)	302,000	354,000	466,000	
DCF	(320,000)	274,545	292,562	350,113	①
Σ DCF	597,220				
PV Tax Shield	61,515				
NPV	658,735				

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	0	1	2	3	
N WC: inventory	20,000	20,000	20,000	20,000	
receivables	~~80,000~~	80,000	80,000	80,000	①
payables		(28,000)	(28,000)	(28,000)	
	20,000	72,000	72,000	72,000	
Δ NWC	20,000	52,000	0	0	①

Tax Shield:

$$\left[\frac{(300,000)(.4)(.3)}{(.10+.4)}\right] \overset{①}{\times} \left[\frac{1+.5(.1)}{1.10}\right] - \left[\frac{(40,000)(.4)(.3)}{0.1+.4}\right] \overset{①}{\left[\frac{1}{1.1^3}\right]}$$

$$= 68,727 - 7213$$

$$= 61,515$$

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Question 5: Decision Rules (6marks)

Describe the interpretation and calculation of the profitability index, net present value and discounted payback decision rules. Why might it be useful to report all three decision rules when communicating an investment decision?

$$PI = \frac{PV\ +ve\ CF}{PV\ -ve\ CF}\ , \quad PI > 1\ \text{accept} \qquad \text{①}$$

$$NPV = PV\ +ve\ CF - PV\ -ve\ CF, \quad NPV > 0\ \text{accept} \quad \text{①}$$

Discounted Pay back = # of periods where $\sum PV\ CF \geq 0$ ①

1) PI communicates the relative profitability of a project ①

2) NPV communicates the level or total profit ①

3) payback communicates the amount of time to recover ① capital

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Question 6: Time Value of Money (8 marks)

Today is your 25th birthday. You plan on making bank deposits, starting today and once a year thereafter for 40 years, with the exception of your 30th and 35th birthdays when you plan on taking a vacations (and thus you will skip making a deposit on those years only). Suppose that your savings account pays interest of 8% per year compounded annually and you want retirement savings of $ 2,000,000 on your 68th birthday. How much do you need to deposit each year to reach your retirement goal?
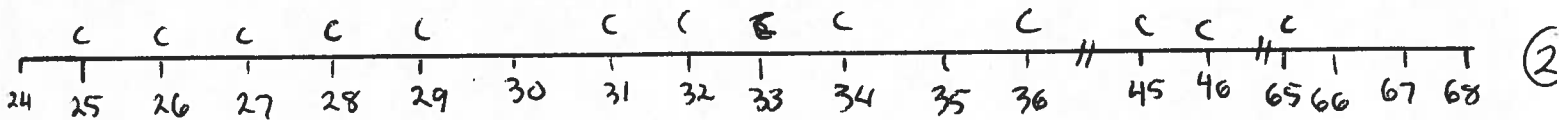
$$PV_{24} = \frac{2,000,000}{(1.08)^{44}} = 67,668.2203 \quad \textcircled{2}$$

$$67,668.2203 = \frac{c}{0.08}\left[1 - \frac{1}{(1.08)^{41}}\right] - \frac{c}{(1.09)^{6}} - \frac{c}{(1.08)^{11}}$$

$$67,668.2203 = 11.9672\,c - 0.6302\,c - 0.4289\,c$$

$$\textcircled{4}$$

$$c = 6203.48$$

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