**Topic: Simple and Compound Interest**

Time: 45 mins Marks: /45 marks

**Calculator Assumed**



**Question One: [2, 2, 2, 2 : 8 marks]**

a) Calculate the interest payable on a loan of $2,100, borrowed for 3 years at 2.5% simple interest.

b) After 5 years, an investment of $3,180 has increased to $4,000. If it was invested in a simple interest account, calculate the rate of interest.

c) After one and a half years the amount of interest on a simple interest investment is $57. If the rate of interest was 3.9%, what was the principal?

d) What is the total amount payable on a loan of $4,198 borrowed for 5 months at 2.8% simple interest?

**Question Two: [8 marks]**

Marco wishes to invest $1,200 for 8 years. The following investment opportunities are available:

1. Simple interest at 14.5% p.a.
2. Compound interest at 8.9% p.a. compounding annually.
3. Compound interest at 12.2% p.a. compounding monthly.

Which investment plan should he choose to maximize the interest earned? Show full working to justify your answer.

**Question Three [8 marks]**

Hazel has $7,900 invested in an account which calculates the interest by using the following breakdown.

The first $1,000 receives a flat simple interest rate of 5.4% p.a.

The next $2,000 receives a compound interest rate of 5.4% p.a. compounding annually.

The next $4,000 receives a compound interest rate of 5.4% p.a. compounding bi-annually.

The remainder of the investment receives a compound interest rate of 5.4% p.a. compounding monthly.

Calculate the interest payable to Hazel after she invests in this account for 18 months.

**Question Four: [7 marks]**

Justine borrows $1,000 from a loan shark where interest is calculated at 12.5% p.a. compounding monthly. However every month the interest rate increased by 0.5% p.a.

If Justine borrows the money for 3 months, how much interest does she owe after 3 months?

**Question Five: [2, 2: 4 marks]**

If we assume that the average annual rate of inflation were to remain steady at 4.5%, and has remained at this rate for several years leading up to now, how much would an item currently valued at $50, be worth

a) in 7 years time?

b) two years ago?

**Question Six: [5 marks]**

The Smith family have a $300,000 mortgage. This is borrowed at 5.9% p.a. compounded monthly for 25 years. The value of the house rises by 2.5% each year. If none of the borrowed amount, nor the interest is paid off the mortgage in 5 years, compare the size of the mortgage to the value of the house if the house was originally bought for $400,000.

**Question Seven: [5 marks]**

A particular commodity originally costs $95/kg at the start of 2005. For a solid 5 year period the price of the commodity appreciates by 2.1% p.a. at which point there is an oversupply of the commodity and then the price begins to depreciate at a steady 5.9% p.a.

At the beginning of which year will the price first be below $95/kg?

**Simple and Compound Interest**

**SOLUTIONS**

Time: 45 mins Marks: /45 marks

**Calculator Assumed**



**Question One: [2, 2, 2, 2 : 8 marks]**

a) Calculate the interest payable on a loan of $2,100, borrowed for 3 years at 2.5% simple interest.

b) After 5 years, an investment of $3,180 has increased to $4,000. If it was invested in a simple interest account, calculate the rate of interest.

c) After one and a half years the amount of interest on a simple interest investment is $57. If the rate of interest was 3.9%, what was the principal?

d) What is the total amount payable on a loan of $4,198 borrowed for 5 months at 2.8% simple interest?

**Question Two: [8 marks]**

Marco wishes to invest $1,200 for 8 years. The following investment opportunities are available:

1. Simple interest at 14.5% p.a.
2. Compound interest at 8.9% p.a. compounding annually.
3. Compound interest at 12.2% p.a. compounding monthly.

Which investment plan should he choose to maximize the interest earned? Show full working to justify your answer.







Plan 3 is the best

**Question Three [8 marks]**

Hazel has $7,900 invested in an account which calculates the interest by using the following breakdown.

The first $1,000 receives a flat simple interest rate of 5.4% p.a.

The next $2,000 receives a compound interest rate of 5.4% p.a. compounding annually.

The next $4,000 receives a compound interest rate of 5.4% p.a. compounding bi-annually.

The remainder of the investment receives a compound interest rate of 5.4% p.a. compounding monthly.

Calculate the interest payable to Hazel after she invests in this account for 18 months.









Total interest = $653.76

**Question Four: [7 marks]**

Justine borrows $1,000 from a loan shark where interest is calculated at 12.5% p.a. compounding monthly. However every month the interest rate increased by 0.5% p.a.

If Justine borrows the money for 3 months, how much interest does she owe after 3 months?









Total interest owing = $32.86

**Question Five: [2, 2: 4 marks]**

If we assume that the average annual rate of inflation were to remain steady at 4.5%, and has remained at this rate for several years leading up to now, how much would an item currently valued at $50, be worth

a) in 7 years time?

b) two years ago?

**Question Six: [5 marks]**

The Smith family have a $300,000 mortgage. This is borrowed at 5.9% p.a. compounded monthly for 25 years. The value of the house rises by 2.5% each year. If none of the borrowed amount, nor the interest is paid off the mortgage in 5 years, compare the size of the mortgage to the value of the house if the house was originally bought for $400,000.





 The mortgage is $49 916.54 less than the value of the house.

**Question Seven: [5 marks]**

A particular commodity originally costs $95/kg at the start of 2005. For a solid 5 year period the price of the commodity appreciates by 2.1% p.a. at which point there is an oversupply of the commodity and then the price begins to depreciate at a steady 5.9% p.a.

At the beginning of which year will the price first be below $95/kg?



 (2011)



