

Annuity Questions

F -1

[Spring 1995]

An equipment is bought for Rs. 2,000 as down payment on a monthly installment of Rs 400 each for one year. If money is worth 12% compounded monthly, what is the cash price of the equipment?

(M - 7)

F -2

[Autumn 1995]

A company establishes a sinking fund to provide for the payment of Rs. 100,000 maturing in 4 years. Contributions to the fund are to be made at the end of every six months. Find the amount of each semiannual deposit if interest is at 8% compounded semiannually.

(M - 6)

F -3

[Autumn 1996]

Determine the present value of a series of 60 monthly payments of 2,500 each which begins one month from today. Assume interest of 12% per annum compounded monthly.

(M - 6)

F -4

[Spring 1997]

A machine costs a company Rs. 1,000,000 and its effective life is estimated to be 20 years. If the scrap is expected to realize Rs .50,000 only. Find the sum to be invested every year at 13.25% compounded annually for 20 years to replace the machine which costs than 30% more over its present values.

(M - 6)

F -5

[Autumn 1997]

Mr. Ikram establishes a special retirement fund at age of 40 by depositing Rs. 1,000 per month into an account which pays 9% interest compounded monthly. After 20 years he retires,. He decides to make equal monthly withdrawals from the retirement fund over the next ten years. Determine the size of monthly withdrawals.

(M - 6)

F -6

[Spring 1998]

An investor wants to receive Rs.6,000 semiannually for 8 years from a saving scheme which yields 10 percent interest per year compounded semiannually. How much he should place in the account to obtain payments of Rs 6,000 beginning 6 months from the day of deposit.

(M - 6)

F -7

[Autumn 1998]

A firm will need Rs. 300,000 at the end of 3 years to repay a loan. The firm decided to deposit Rs. 20,000 each quarter during these 3 years into an account which yields 16 percent per annum compounded quarterly Will the firm accumulate enough amount in this account to pay the loan at the end of 3 years?

(M - 6)

F -8

[Spring 1999]

A firm has set up a contingency fund yielding 16 percent interest per year compounded quarterly. The firm will be able to deposit Rs. 10,000 into the fund at the end of each quarter. What will be the value of the contingency fund at the end of 3 years?

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(M - 6)

F -9

[Spring 2000]

What is the present value of Rs. 15,000 received at the end of the current year and next four years if the applicable rate is 7% per annum?

(M - 4)

F -10

[Autumn 2000]

A firm wants to establish a library maintenance fund for a university. The firm would provide Rs.25,000 every 6 months. The fund yields a 10 percent annual rate of interest compounded semiannually. What is the initial deposit required to establish a perpetual stream of payments from the interest every 6 months after making the first payment from the principal?

(M - 3)

F -11

[Spring 2001]

Mr. B is employed as an executive and his present age is 50 years. His present saving is worth Rs.100,000. It is invested in a scheme @ 10% compounded annually. He is due to retire at the age of 60 years. He wishes to receive Rs.80,000/- per annum for 10 years after his retirement. The applicable interest rate then will be 9%. How much amount shall he save and deposit annually at the end of current year and next nine years i.e. upto his retirement to achieve his aim provided he can earn interest of 8% on his annual savings upto his retirement on annual compounding basis.

(M - 8)

F -12

[Autumn 2001]

- (a) A person calculates that by depositing Rs.12,500 each year, starting from the end of the first year, he shall be able to accumulate Rs.150,000 at the time of nth deposit if the rate of interest is 4%. Find the number of years in which he can accumulate the required amount. (M - 3)
- (b) A food distributor has borrowed Rs.950,000 to buy a warehouse. The loan is for 10 years at an annual interest rate of 12 percent compounded quarterly. What is the amount of quarterly payments which he must make to pay back the loan? How much interest he would pay? (M - 6)

F -13

[Spring 2002]

- (a) An individual plans to borrow Rs.400,000 to buy a new car and would like to keep the payments of Rs.12,500 a month. The loan will be for 3 years at a 12 percent annual rate compounded monthly. Will the monthly payments exceed Rs.12,500 per month limit established by the borrower? (M - 6)
- (b) M/s. ABC Limited is expected to pay Rs.18 every year on a share of its stock. What is the present value of a share if money worth is 9% compounded annually? (M - 4)

F -14

[Autumn 2002]

A person deposits Rs.30,000 every six months into a retirement account. The account pays an annual interest rate of 12 percent compounded semi-annually. What will be the value of account after 15 years?

(M - 6)

F -15

[Spring 2003]

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In 6 years a Rs.4 million machine will have salvage value of Rs. 0.4 million. A new machine at that time is expected to sell for Rs.6 million. In order to provide funds for the difference between the replacement cost and the salvage value, a sinking fund is established into which equal payments are made at the end of each quarter. If the funds earn 12% compounded quarterly, how much should each payment be?
(M - 6)

F -16

[Autumn 2003]

A person has borrowed Rs.950,000 for a small business. The loan is for five years at an annual interest rate of 8 percent compounded quarterly. What is the amount of quarterly payments to pay back the loan?
(M - 5)

F -17

[Spring 2004]

How much money must be invested in an account at the end of each quarter if the objective is to have Rs.225,000 after 10 years. The account can earn an interest rate of 9 percent per year compounded quarterly. How much interest will be earned over the period?
(M 6 6)

F -18

[Autumn 2004]

A home buyer made a down payment of Rs. 200,000 and will make payments of Rs.75,000 each 6 months, for 15 years. The cost of fund is 10% compounded semi-annually.

- (i) What would have been equivalent cash price of the house?
- (ii) How much will the buyer actually pay for the house?

(M - 7)

F -19

[Autumn 2005]

Farhan borrowed Rs.100,000 for one year at 12% annual interest compounded monthly. The loan is to be paid in equal monthly installments.

- (i) Determine the amount of each installment.
- (ii) Calculate principal repayment included in first installment.
- (iii) Find the total interest paid during the year.

(M - 8)

F -20

[Spring 2006]

(a) A company is planning to pay off a loan at the end of the third year. The amount then payable would be Rs. 120 million. The company wants to create a sinking fund for this purpose. The company will earn a 10% annual rate compounded quarterly on all deposits. Contributions to the fund are to be made at the end of each quarter. What is the required quarterly deposit?
(M - 8)

(b) A construction company is considering a project which would cost Rs.1, 700,000 now plus Rs. 800,000 at the end of year 1. This investment would result in net earnings of Rs. 500,000 per annum from year 2 to 8, to be received at the end of the year. The company requires a return of 11% per annum on its investments.

- (i) Calculate the Net Present Value of the project.
- (ii) Determine whether the project is viable?

(M - 8)

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F -21

[Autumn 2006]

A machine costs a company Rs. 5,200,000 and its effective life is estimated to be 20 years. A sinking fund is set up for its replacement by a new machine at the end of its life time, when its scrap value will be Rs. 250,000 only. The price of the new machine is estimated to be 50% higher than that of the present one. Determine what amount should be set aside at the end of each year, if it earns 8% interest per annum compounded annually. **(M - 8)**

F -22

[Spring 2007]

Excel Corporation has issued bonds having face value of Rs. 500 million. They carry annual interest @10% compounded semi-annually. The bonds are redeemable in $2\frac{1}{2}$ years. Interest as well as the face value will be paid on maturity. Find the amount that should be deposited each month into a sinking fund to be able to redeem all bonds on maturity, if the deposited amount earns interest @ 9% compounded monthly. **(M - 7)**

F -23

[Autumn 2007]

Hassan wants to save money over a period of ten years in order to meet the expenses to be incurred on higher education of his son. He has recently invested a sum of Rs. 100,000 and plans to save and invest Rs. 40,000 at the end of each year. Calculate the amount that will be available to him at the end of the 10th year, if he earns a profit of 8% each year. **(M - 8)**

F -24

[Spring 2008]

Ashraf purchased a new car and made a down payment of Rs. 50,000. He is further required to pay Rs. 30,000 at the end of each quarter for five years. You are required to:

- (i) Find the cash purchase price of the car, if the quarterly payments include 12% interest per annum compounded quarterly.
- (ii) Find the total amount of interest Ashraf has to pay.

(M - 9)

F -25

[Autumn 2008]

Shahab has the opportunity to invest in a fund which earns 6% profit compounded annually. How much should he invest now if he wants to receive Rs.6,000 (including principal) from the fund, at the end of each year for the next 10 years? How much interest he would earn over the period of 10 years? **(M - 8)**

F -26

[Spring 2009]

(a) A company is considering a project which requires an investment of Rs. 1,200,000 now and Rs. 300,000 at the end of the 1st year. It will earn Rs. 200,000 at the end of 2nd year and thereafter it will earn a fixed annual amount up to the 7th year. If interest rate is 11%, find the amount that the project should earn annually i.e. from year 3 to year 7 if the company desires to earn a net present value of Rs. 100,000. **(M - 7)**

(b) Younus Limited (YL) has borrowed an amount of Rs. 100,000 at an interest of 10% per annum compounded semi-annually. To pay off the loan at the end of four years, YL has created a sinking fund, which yields a return of 8% per annum compounded quarterly. Determine the amount which YL must deposit at the end of each quarter, in the sinking fund, to settle the loan at the end of four years? **(M - 8)**

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F -27

[Autumn 2009]

Shiraz acquired a new car worth Rs. 850,000 through a leasing company. He made a down payment of Rs. 200,000 and has agreed to pay the remaining amount in 10 equal semi-annual installments. The leasing company will charge interest @ 19% per annum, over the lease term. You are required to find:

- (i) Amount of semi-annual installment.
- (ii) Total amount of interest that Shiraz will pay, over the term of the lease.

(M - 8)

F -28

[Spring 2010]

- (a) Imran deposited Rs. 3,000 per month into a saving account for a year. He would deposit Rs. 5,000, Rs. 8,000 and Rs. 10,000 per month during second, third and fourth year respectively. If the bank offers 6% interest compounded monthly, find the total amount Imran would have saved at the end of four years. **(M - 7)**
- (b) Noshervan Builders have launched an apartment project. Price of each apartment is Rs. 1,628,000. The buyer has to pay Rs. 200,000 at the time of booking and Rs. 34,000 per month for 3½ years to the builder. Possession will be given to buyers six months after the payment of last installment. If the amount of interest included in the price payable to the builder is Rs. 628,000, using logarithm, determine the annual rate of interest compounded monthly. **(M - 8)**

F 6 29

[Autumn 2010]

Mr. Hamid plans to invest equal annual amounts in a bank for five years starting from January 1, 2011 in order to have the following amounts available with him:

- a) Rs. 1.0 million for the marriage of his daughter on January 01, 2018
- b) Education expenses of his son consisting of four annual payments of Rs. 240,000 Commencing from January 1, 2019.

If the bank agrees to pay interest @ 10% per annum compounded annually, calculate the amount of annual deposits which he would be required to invest.

(M - 8)

F 6 30

[Spring 2011]

Meena has invested Rs. 700,000 in an investment scheme. In return, she would receive Rs. 74,587 semi annually in arrears, for the six years. She would not receive any amount afterwards. Find the nominal and effective rate of return of the scheme.

(M 6 5)

F 6 31

[Spring 2012]

Ali would require a sum of Rs. 300,000 after three years from now and a sum of Rs. 500,000 after five years from now, for the purpose of education of his son. He is planning to deposit quarterly amounts in an investment scheme to get the desired amounts at the required time. If the rate of interest is 12% compounded quarterly, what amount should Ali deposit at the start of each quarter?

(M 6 5)

F 6 32

[Autumn 2012]

Amin deposited Rs.25,000 every six months in a fund earning interest at 6% compounded semi annually. The first deposit was made when he was 48 years of age and the last deposit was made when he was 55 and at that time the entire amount was invested in another fund

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which yielded 8% per annum. How much amount will he have in the fund, when he retires at the age of 60 years? (M 6 6)

F 6 33**[Spring 2012]**

Ali paid Rs. 34,434 per month for three years to pay back a bank loan. Calculate the amount borrowed by Ali and interest paid thereon, if interest was charged at the rate of 14.5% per annum on the outstanding amount, on a monthly basis. (M 6 5)

F 6 34**[Spring 2013]**

Ali paid Rs. 34,434 per month for three years to pay back a bank loan. Calculate the amount borrowed by Ali and interest paid thereon, if interest was charged at the rate of 14.5% per annum on the outstanding amount, on a monthly basis. (M 6 5)

F 6 35**[Autumn 2013]**

Kiran deposited Rs. 5000 per month (first day of the month) in a saving account in the year 2011 and Rs7500 per month in the year 2012. Find the total amount saved by her at the end of year 2012 if she earned @8% compounded monthly.

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