

### A1. Rick

Rick runs a coffee shop and is looking at investing in a new Italian coffee maker that will make espressos faster. The coffee maker costs £1,500 and Rick expects that the coffee maker would generate extra sales of £650 in year 1, £950 in year 2, £1,050 in year 3, and £1,200 in year 4. His operating costs would be £300 for year 1, £400 for year 2, £500 for year 3, and £550 for year 4. The coffee maker will be depreciated on a straight-line basis over a four-year period and the machine is expected to have a scrap value of £200.

All of Rick's sales and expenses are paid by cash.

Rick decides to do a comparison of Accounting Rate of Return (ARR), Pay Back Period, and Net Present Value in order to make a decision as to whether to invest in the coffee machine or not.

#### 1. Which of the following formulae for ARR is correct?

- A  $ARR = \frac{\text{Average annual cash flow}}{\text{Average annual amount invested in the project}} \times 100\%$
- B  $ARR = \frac{\text{Average annual operating profit}}{\text{Average annual cash flow}} \times 100\%$
- C  $ARR = \frac{\text{Average annual operating profit}}{\text{Average amount invested in the project}} \times 100\%$
- D  $ARR = \frac{\text{Average amount invested in the project}}{\text{Average annual operating profit}} \times 100\%$

#### 2. Which of the following statements is true?

- A Operating profit before depreciation in year 1 will be £650
- B Operating profit before depreciation in year 1 will be £375
- C Operating profit before depreciation in year 1 will be £350
- D Operating profit before depreciation in year 1 will be £ 25

#### 3. Which of the following statements is true?

- A Depreciation per annum is £375 per annum
- B Depreciation per annum is £350 per annum
- C Depreciation per annum is £325 per annum
- D Depreciation per annum is £300 per annum

**4. Average annual profit for the four years will be:**

- A £325 per annum
- B £275 per annum
- C £200 per annum
- D £25 per annum

**5. What is the average amount invested in the project?**

- A £850
- B £650
- C £425
- D £325

**6. What is the Accounting Rate of Return?**

- A 31%
- B 50%
- C 38%
- D 47%

**7. Which of the following statements regarding payback period, is true?**

- A The payback period should take account of depreciation of assets and should take account of any scrap value of assets.
- B The payback period should not take account of depreciation of assets and not take account of any scrap value of assets.
- C The payback period should take account of depreciation of assets and should not take account of any scrap value of assets.
- D The payback period should not take account of depreciation but should take account of any scrap value of assets.

**8. In calculating the payback period what is the cumulative cash flow after year 1?**

- A -£1,500
- B -£850
- C £1,150
- D -£1,150

**9. In calculating the payback period what is the cumulative cash flow after year 2?**

- A -£100
- B £100
- C -£600

D £600

**10. What is the Payback Period to the nearest month?**

- A 2 years and 9 months
- B 2 years and 3 months
- C 3 years and 1 month
- D 3 years and 11 months

**11. Which of the following is true?**

- A NPV uses cash flows and takes into account the time value of money.
- B NPV uses operating profits and takes into account the time value of money.
- C NPV uses cash flows but does not take into account the time value of money.
- D NPV uses operating profits and does not take into account the time value of money.

**12. Using the NPV method and a discount factor of 10% what would be the present value adjustment required for the cash flows arising at the start of the project and at the end of year one?**

- A Start of the project cash flows require no adjustment, year one cash flows need to be multiplied by  $1/(1+0.1)$ .
- B Start of the project cash flows require no adjustment, year one cash flows need to be multiplied by  $(1+0.1)/1$ .
- C Start of the project cash flows need to be multiplied by  $1/(1+0.1)$ , year one cash flows by  $1/(1+0.1)^2$ .
- D Start of the project cash flows need to be multiplied by  $(1+0.1)/1$ , year one cash flows by  $(1+0.1)^2/1$ .

**13. Using a discount factor of 10% what would be the cash flow using the NPV method in year 1?**

- A £350
- B £318
- C £289
- D £271

**14. Using a discount factor of 10% what would be the present value of the cash flow arising in year 2?**

- A £1,045
  - B £662
  - C £456
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D £412

**15. What is the Net Present Value of the Project?**

- A +£600
- B +£3,130
- C +£130
- D -£130

**16. Which of the following statements is true?**

- A Any project expected to give a positive NPV, should definitely be undertaken.
- B Any project expected to give a negative NPV, should definitely be undertaken.
- C Any project expected to give a positive NPV, is worthy of further consideration.
- D The NPV is an accurate measure of exact measure of how much a project will be worth to a business.

**Longer questions**

**A2. Skips Lite Lunches accounting rate of return**

Skip is keen to work in an environmentally friendly environment where he and his organization are socially and corporately responsible. Skip has been running his lunch delivery business Skips Lite Lunches in Canary Wharf for the last 5 years and is looking at how he can collect and recycle the packaging that he uses for the lunches. He has investigated small business recycling machines that he could use on his premises and wants to see if this would be financially sustainable for him.

The initial investment in the recycling machine would be £12,500. The machine would have a 4-year life span and he would expect to be able to trade in the machine after 4 years for £1,500. He expects that he would make increased profits before depreciation of £2,500 in year 1, £3,500 in year 2, £4,500 in year 3, and £5,000 in year 4 from his more environmentally friendly

business model. A discount rate of 12% should be applied to the proposed project.

REQUIRED:

Calculate the accounting rate of return for the proposed introduction of the recycling machine.

**A3. Skips Lite Lunches payback period**

Using the information in A2 calculate the payback period of the recycling machine.

**A4. Skips Lite Lunches net present value**

Using the information in A2 calculate the net present value of the recycling machine.

**A5. Skips Lite Lunches decision making**

Using the results from A2 to A4 advise Skip as to whether he should invest in the recycling machine.

**A6. 3D printing**

3D-Print is a small business offering its printing services to make 3D engineering parts. The first machine used to set up the business is now old, and the manager is keen to expand their technological capabilities. This machine has little value and business is likely to decline with its continued use.

The initial investment in the 3D printer would be £37,500. The machine would have a 5-year life span and he would expect to be able to trade in the machine after 5 years for £2,500. He expects that the new machine would increase profits before depreciation by £8,200 in year 1, £9,200 in year 2,

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£10,500 in year 3, and £15,000 in years 4 and 5. A discount rate of 7% should be applied to the proposed project.

REQUIRED:

Calculate the accounting rate of return for the proposed introduction of the 3D printing machine.

**A7. 3D Payback period**

Using the information above, calculate the payback period of the 3D printing machine.

**A8. 3D Net Present Value**

Using the information above, calculate the net present value of the 3D printing machine. Advise the manager of 3D printers whether he should invest in the 3D printing machine, based on the answers to A6 to A8.