Question 6

Source B2

The directors of J Limited plan to buy a machine costing $550 000. The machine has a useful life of four years with no residual value.

It is expected that the machine will generate a net cash inflow of $200 000 for each of the first two years, followed by a decrease of 10% in year 3 and a further decrease of 10% in year 4. The cost of capital will be 10%.

The discount factors at 10% and 16% are

	10%	16%
Year 1	0.909	0.862
Year 2	0.826	0.743
Year 3	0.751	0.641
Year 4	0.683	0.552

Answer the following questions in the question paper. Questions are printed here for reference only.

(a) Explain what is meant by the term 'cost of capital'. [2]

(b) Calculate for the proposed investment:

(i) payback period (in years and months) [2]

(ii) accounting rate of return (to **two** decimal places) [3]

(iii) net present value (NPV) [3]

(iv) internal rate of return (IRR) (to **two** decimal places). [4]

(c) Advise the directors whether or not the company should purchase the machine. Justify your answer. [3]

Additional information

The directors decide to use the NPV method for investment appraisal. Due to recent adverse economic conditions, the directors think that they should use a cost of capital of 16%.

(d) Explain the impact on the directors' decision to purchase the machine if the cost of capital is 16%. [2]

Additional information

In view of the increase in the cost of capital to 16%, the directors consider that net cash inflows for each year need to be improved.

(e) Calculate the net cash inflows for **each** of the four years so that the NPV of the proposed investment is zero. [6]

[Total: 25]

Question	Answer	Marks
6(a)	It is the cost of financing an investment through debt and/or equity. **(1)** It is also the minimum required rate of return for an investment. **(1)** **Accept other valid answers.**	**2**
6(b)(i)	2 years **(1)** + [($550 000 – $400 000)/180 000] × 12 = 2 years and 10 months **(1)**	**2**
6(b)(ii)	Average profit ($200000 × 2 + $180 000 + $162 000 – $550 000)/4 = $48 000 **(1)** $48 000/($550 000/2) **(1)** = 17.45% **(1)OF**	**3**

Question	Answer	Marks
6(b)(iii)	<table><tr><td></td><td>$</td><td>10%</td><td>NPV $</td><td></td></tr><tr><td>Year 0</td><td>(550 000)</td><td>1</td><td>(550 000)</td><td>**(1)**</td></tr><tr><td>Year 1</td><td>200 000</td><td>0.909</td><td>181 800</td><td>**}**</td></tr><tr><td>Year 2</td><td>200 000</td><td>0.826</td><td>165 200</td><td>**}**</td></tr><tr><td>Year 3</td><td>180 000</td><td>0.751</td><td>135 180</td><td>**}**</td></tr><tr><td>Year 4</td><td>162 000</td><td>0.683</td><td>110 646</td><td>**}(1)**</td></tr><tr><td></td><td>192 000</td><td></td><td>42 826</td><td>**(1)OF**</td></tr></table>	**3**
6(b)(iv)	<table><tr><td></td><td>$</td><td>16%</td><td>$</td><td></td></tr><tr><td>Year 0</td><td>(550 000)</td><td>1</td><td>(550 000)</td><td></td></tr><tr><td>Year 1</td><td>200 000</td><td>0.862</td><td>172 400</td><td></td></tr><tr><td>Year 2</td><td>200 000</td><td>0.743</td><td>148 600</td><td></td></tr><tr><td>Year 3</td><td>180 000</td><td>0.641</td><td>115 380</td><td></td></tr><tr><td>Year 4</td><td>162 000</td><td>0.552</td><td>89 424</td><td></td></tr><tr><td></td><td>192 000</td><td></td><td>(24 196)</td><td>**(1)**</td></tr></table> 10% **(1)** + [6% × ($42 826/($42 826 + $24 196)] **(1)OF** = 13.83% **(1)OF**	**4**
6(c)	The payback period is within the life of the machine **(1)** There is a positive NPV **(1)** The IRR is higher than the cost of capital **(1)** The directors should purchase the machine **(1)** **Max 2** **1 mark for decision.** **Accept OF comments**	**3**
6(d)	The NPV is negative **(1)** therefore the machine should not be purchased **(1)** **Accept OF comments**	**2**

Question	Answer	Marks
6(e)	16% 0.862 ×1 0.862 0.743 ×1 0.743 0.641 ×0.9 0.5769 0.552 ×0.9×0.9 0.44 712 2.62 902 **(1)** $550 000**(1)** ÷ 2.62 902 = $209 203 $ Year 1 209 203 **(1)** Year 2 209 203 **(1)** Year 3 $209203x0.9 188 283 **(1)** Year 4 $188283x0.9 169 455 **(1)** 776 145 Proof: $ 16% $ Year 0 (550 000) 1 (550 000) Year 1 209 203.4 0.862 180 333 Year 2 209 203.4 0.743 155 438 Year 3 188 283.1 0.641 120 690 Year 4 169 454.8 0.552 93 539 0 Alternative methods of calculation are possible, e.g. to increase each year's discounted cash flow by 4.6% to eliminate the deficit of $24 196 and then to gross up each year's increased amount by the discount rate. This gives slightly different figures due to rounding but is a correct answer.	**6**