

Construction Finance and Risk

22CVB112

Semester 2 2023

In-Person Exam Paper

This examination is to take place in-person at a central University venue under exam conditions. The standard length of time for this paper is **2 hours**.

You will not be able to leave the exam hall for the first 30 or final 15 minutes of your exam. Your invigilator will collect your exam paper when you have finished.

Help during the exam

Invigilators are not able to answer queries about the content of your exam paper. Instead, please make a note of your query in your answer script to be considered during the marking process.

If you feel unwell, please raise your hand so that an invigilator can assist you.

You may use a calculator for this exam. It must comply with the University's Calculator Policy for In-Person exams, in particular that it must not be able to transmit or receive information (e.g. mobile devices and smart watches are **not** allowed).

Answer four questions in total:

Answer **TWO QUESTIONS** in **Section A**.

Answer **TWO QUESTIONS** in **Section B**.

Please use a separate answer book for each section.

All questions carry equal marks.

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SECTION A
(Answer **TWO QUESTIONS** in Section A)

1.
 - a) Explain the purpose of a risk register and its role in the management of construction project risk.
[8 marks]
 - b) Explain the required content of a project risk register.
[6 marks]
 - c) Explain how some probable risk events may harm a construction project while others may help it.
[5 marks]
 - d) Explain the role of allowances and contingencies in construction project risk management practice.
[6 marks]

2. A public sector department has an ambitious plan for an infrastructure development scheme involving several mega and complex projects within the next 5 years. The department, however, has inherent problems with a lack of expertise in complex project management and a limited availability of financial resources. The relevant Minister is very keen to get the development completed within time, within cost and to prescribed quality standards. The Minister has asked for your advice and help. Some external consultants to the department have suggested Pure Project Finance and Public Private Partnerships (PPP) as alternatives for funding the scheme.
 - a) Briefly explain why the PPP alternative should be deemed a suitable solution for the scheme.
[5 marks]
 - b) Outline and discuss 5 key issues that would form the basis of your advice to the Minister in order to reduce the risk of PPP failure for the scheme.
[10 marks]
 - c) The Minister is not clear about the difference between **corporate financing** and **pure project financing**. Describe the two options of financing in terms of their suitability for the development scheme.
[10 marks]

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3. a) Briefly explain the significance of the terms **NPV**, **IRR** and **discount factor** for making decisions on project selection. [6 marks]
- b) Two projects (A and B) are projected to generate cash flows over the period of 5 years as follows:

Project A	Project B	Year
-1000	-1000	0
329	250	1
500	230	2
100	300	3
250	230	4
350	315	5

- i) Calculate the NPV for each of the projects using the discount factors 10% for Project A and 3% for Project B. Find out IRR for Project A and Project B.
- Use appropriate units and indicate the working process. A Present Value table is appended to this paper. [11 marks]
- ii) Which project is preferable based on NPV analysis for 10% and 3% discount factors? [4 marks]
- iii) Which project, **A** or **B**, is preferable based on the IRR analysis? [4 marks]

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SECTION B
(Answer **TWO QUESTIONS** in Section B)

4. Look at the financial accounts.

	2022 £m	2023 £m
P&L Account		
Sales	<u>170</u>	<u>180</u>
Cost of sales	<u>120</u>	<u>135</u>
Gross profit	<u>50</u>	<u>45</u>
Administration and expenses	<u>20</u>	<u>21</u>
Operating profit	<u>30</u>	<u>24</u>
Interest	1	2
Profit before tax	<u>29</u>	<u>22</u>
Tax	7	4
Net profit	<u>22</u>	<u>18</u>

Balance Sheet		
Current Asset		
Cash in the bank	5	3
Debtors	40	46
Stock	15	21
Non-Current assets		
Offices and plant	70	68
Goodwill	6	6
Provision	0	2
Current liabilities		
Creditors	30	35
Bank overdraft	4	0
Noncurrent liabilities		
Long term loan	4	4
Net assets		
Equity		
Shareholder funds	72	72
Share premium	10	11
Retained earnings		

Question 4 continues/...

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- a) Explain the term share premium. Explain the possible meaning of the term provision in the table above. Define share option.
[6 marks]
- b) Calculate the gross profit margin, the operating profit margin and net profit margins and discuss the possible reasons for the differences between each. Calculate the debtor days and creditor days explaining the relevance of these figures.
[9 marks]
- c) Calculate the current ratio, the acid test ratio, balance sheet gearing ratio and explain the results.
[7 marks]
- d) Stock in the construction industry is often different to manufacturing. Identify three possible contributors to stock giving an example of each in the construction accounts for a house builder.
[3 marks]

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5. A project is being monitored using the earned value method, has a budget of £4m and is planned to complete in 12 months. The following table shows the values for BCWS and BCWP at the end of the first few weeks. The ACWP at week twenty is £1.5m. All costs relate to labour only.

Activity	Start at the beginning of week	Duration in weeks	BCWS (£K)	BCWP % complete	ACWP
A	0	4	80	100	
B	0	8	120	100	
C	5	12	360	50	
D	9	8	320	60	
E	17	12	720	40	
F	13	8	400	20	
G	25	12	600	0 (zero)	

Required:

- a) Draw an earned value diagram updated to show the position at the end of week twenty. Label your diagram as fully as possible. [7 marks]
- b) Why is it possible for values for BCWS to be available beyond the current date (assumed to be end of twenty weeks) but not values for BCWP and ACWP? [3 marks]
- c) At the end of week twenty, what are the values of the cost variance and schedule variance? Explain the meaning of these values. [4 marks]
- d) At the end of week twenty, what would you estimate the cost at completion and the likely time for completion of the project to be, making two different assumptions about future performance? [5 marks]
- e) What can a project manager deduce about a project in this situation? Explain how this situation may have occurred. Suggest actions that a project manager might take to manage a project in this situation. [6 marks]

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6. a) The construction industry is often perceived to be monopolistic although framework agreements are often considered to create oligopolies with the possibility of collusion. Identify the advantages and disadvantages to the client of tendering through framework agreements and competitive tendering. [10 marks]
- b) A construction company is looking to grow its business and is considering long term loans. Discuss the advantages and disadvantages of:
- i) issuing shares
 - ii) leasing
 - iii) long term loan from the bank
 - iv) a government bond.
- [8 marks]
- c) Calculate the weighted average cost of capital (£400k) based on the following;
- Ordinary shares (£200k) at 4%
Government bond (£100k) at 8%
Bank loan (£100k) at 13%
- [2 marks]
- d) Use Porter's five forces to show how the UK construction housing sector works for a national house building developer and why the house purchaser has to pay the asking price for a property. [5 marks]

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PRESENT VALUE TABLE

Present value of \$1, that is $(1+r)^{-n}$ where r = interest rate; n = number of periods until payment or receipt.

Periods (n)	Interest rates (r)									
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149

Periods (n)	Interest rates (r)									
	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.079	0.065
16	0.188	0.163	0.141	0.123	0.107	0.093	0.081	0.071	0.062	0.054
17	0.170	0.146	0.125	0.108	0.093	0.080	0.069	0.060	0.052	0.045
18	0.153	0.130	0.111	0.095	0.081	0.069	0.059	0.051	0.044	0.038
19	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043	0.037	0.031
20	0.124	0.104	0.087	0.073	0.061	0.051	0.043	0.037	0.031	0.026