Loughborough University

Construction Finance and Risk
23CVB112

Semester 2 2024 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.

Present value table is provided.

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

1. a) Construction and Urban Planning developments tend to rely solely on the practice of objective risk for managing the delivery of projects. Outline the components for establishing objective risk, and briefly discuss any two limitations that attend this practice. [6 marks]

b) Your company, G Dickens & Associates has won a contract to develop an office complex comprising a five-storey building, car parking and other external works located on the High Street in Loughborough commissioned by a commercial client. The development is on a 120x188 metre site and currently has an existing structure occupying 25% of the plot which will have to be demolished to make way for the proposed complex. The site is adjoined on two opposing sides by commercial property, on the third side by private residences, and on the fourth by the A6 (High Street). The completed office complex will occupy 90% percent of the site. Table Q1 presents a breakdown of the impact and likelihood associated with each of the work sections for the development based on information from the company's risk database.

Table Q1: Impact and likelihood associated with each of the work section.

Work section	Cost of work section £x1000	Cost Impact if risk occurs £x1000	Likelihood of risk occurring
Demolition and site preparation	380	5	.45
Substructure (excavation and foundation works)	3580	54	.75
Superstructure (frame, walls, and roof)	5203	30	.58
Building services and lift installations	1875	25	.25
Finishes and external cladding	1050	12	.15
Car park and external works	984	11	.35

The Contracts Director for your company has requested you to establish the following:

i) the risk level for each of the work sections. [9 marks]

ii) the level of cost contingency that should be set for the whole development based on the total cost risk. [7 marks]

iii) based on your answer in (ii) justify why the use of a general 5% or 10% contingency is inadequate for covering the risk of project cost growth. [3 marks]

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2. A multi-million-pound infrastructure project is being planned in the centre of Manchester City. The public sector sponsor (comprising the National Government and City Council) is exploring options for immediate and available capital at a reasonable cost to fund the project. The sponsor is open to any possible combination of sources of capital including multilateral development banks.

   a) As a financial advisor, propose and discuss principal sources of funding that the sponsor should consider. [8 marks]

   b) Propose and justify measures that the sponsor can employ to establish the overall cost of capital if a mix of sources are used. [6 marks]

   c) The Manchester City project is estimated to cost above £500 million with expected duration spanning between 7 and 10 years and would need an appropriate financing arrangement for its execution. Your line manager has heard about a "syndicated loan" and would like to know more about it.

      i) Outline the principal advantages and disadvantages of using that option. [6 marks]

      ii) Discuss the main steps in completing a syndicated loan. [5 marks]

3. a) Briefly explain the significance of the terms **NPV**, **IRR** and **discount factors** 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 shown in Table Q3:

Table Q3: Cash flow for Project A and Project B.

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% and 3%. Find out IRR for Project A and Project B.

         Use appropriate units and indicate the working process. [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 in Table Q4.

Table Q4: Financial accounts.

	2023 £m	2024 £m
P&L Account		
Sales	180	230
Cost of sales	135	190
Gross profit	**45**	**40**
Administration and expenses	21	25
Operating profit	**24**	**15**
Interest	2	2
Profit before tax	**22**	**13**
Tax	4	3
Net profit	**18**	**10**

Balance Sheet		
Current Asset		
Cash in the bank	3	2
Debtors	46	50
Stock	21	23
Non-Current assets		
Offices and plant	68	72
Goodwill	6	6
Provision	2	2
Current liabilities		
Creditors	35	40
Bank overdraft	4	3
Noncurrent liabilities		
Long term loan	3	3
Net assets	46	
Equity		
Shareholder funds	72	72
Share premium	11	11
Retained earnings		

Question 4 continues/…

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a) Define the terms: share option, ordinary share. Explain dividend payment and discuss how dividend payments could be paid even if the company did not make a profit. [3 marks]

b) Calculate the gross profit margin, the operating profit margin and net profit margins and discuss the possible reasons for the implications of the results. [6 marks]

c) Calculate the debtor days, creditor days and acid test/quick ratio explaining the relevance of these figures. [6 marks]

d) Calculate the current ratio and balance sheet gearing ratio and explain the results. [6 marks]

e) Define window dressing and explain how and why it may be done. Define amortisation giving two examples. [4 marks]

5. A project is being monitored using the earned value method, has a budget of £4m and is planned to complete in 12 months. Table Q5 shows the values for BCWS and BCWP at the end of the first few weeks. The ACWP at week twenty is £2.2m. All costs relate to labour only.

Table Q5: BCWS and BCWP values for the project.

Activity	Start at the beginning of week	Duration in weeks	BCWS (£K)	BCWP % complete	ACWP
A	**0**	**4**	**100**	**100**	
B	**0**	**8**	**160**	**100**	
C	**5**	**12**	**360**	**100**	
D	**9**	**8**	**400**	**80**	
E	**17**	**12**	**720**	**50**	
F	**13**	**8**	**400**	**80**	
G	**25**	**12**	**600**	**50**	

Question 5 continues/…

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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) Is the project ahead of schedule or behind schedule and is the project over or under budget? State the period of time and the value explaining the possible reasons for your answers. [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]

6. a) The construction industry is often perceived to be monopolistic. State the definition of monopolistic and give an example of the type of contractor in this type of market. Identify the advantages and disadvantages to the client of receiving tenders in this market, [7 marks]

b) A medium sized private construction company is looking to grow its business but is unsure which direction to take. Discuss the advantages and disadvantages of the following:

i) Issuing shares
ii) Buying a small but specialized company
iii) A private funder who wants 45% ownership of the business

[9 marks]

c) Use Porter's five forces to compare a national UK housing contractor, the contractor on a government framework agreement and contractor undertaking competitive tendering for commercial sector work. Discuss the reasons for the ratings you give and identify why the house purchaser has to pay the asking price for a property, whilst the commercial client and government body may get better value. [9 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	0705	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

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