



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2023/2024**

- COURSE NAME : CONSTRUCTION PLANNING &  
SCHEDULING
- COURSE CODE : BFP40103
- PROGRAMME CODE : BFF
- EXAMINATION DATE : JULY 2024
- DURATION : 3 HOURS
- INSTRUCTIONS :
1. ANSWER ALL QUESTIONS
  2. THIS FINAL EXAMINATION IS CONDUCTED VIA  
 Open book  
 Closed book
  3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

**Q1** The construction project life cycle under the conventional approach generally consists of four distinct phases: initiation, planning, design, and construction.

(a) Please provide **TWO (2)** examples for both off-site and on-site activities commonly undertaken by contractors.

(2 marks)

(b) Elaborate on **TWO (2)** examples of activities necessary for project planning and scheduling in each phase of the construction project.

(8 marks)

**Q2** You have been assigned to supervise the construction of a community clinic in Batu Kawan, Pulau Pinang, ensuring completion within the designated timeframe. Given the information provided in **Table Q2**, proceed with the following tasks:

**TABLE Q2**

Activity	Predecessor(s)	Duration (weeks)
A	-	2
B	A	3
C	A	5
D	A	4
E	B, C	2
F	C	3
G	C, D	4
H	E, F, G	2
I	H	3
J	H	2
K	C, D	2
L	I, J, K	4
M	L	1

(a) Produce an Arrow Diagram Network (ADM) for the project and conduct Critical Path Method (CPM) calculations to ascertain the Early Start (ES), Early Finish (EF), Late Start (LS), and Late Finish (LF) times for all activities, along with determining the overall project duration. Additionally, highlight critical activities within your network.

(10 marks)

- (b) Calculate the total float for each activity in the project. (6 marks)
- (c) Create a bar chart based on the calculations performed in Q2(a) and Q2(b). (8 marks)

**Q3** Project crashing involves expediting one or more activities to reduce the overall duration of a project. **Table Q3(1)** outlines the construction activities necessary for the completion of Mr. Aziz's bungalow construction project.

- (a) Briefly discuss the steps involved in the process of crashing a project duration. (6 marks)
- (b) Based on information provided in **Table Q3 (1)**, determine the duration required to complete the project and illustrate the critical path for the project. (8 marks)

**TABLE Q3 (1)**

Activity	Predecessor(s)	Duration (weeks)
A	-	5
B	-	4
C	A	2
D	A, B	4
E	C, D	6
F	E	2

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- (c) Mr. Aziz aims to finalize the renovation project within a 12-week timeframe. By using the information given in **Table Q3 (2)**, demonstrate the crashing steps required and analyse its impact on the cost of the project.

(10 marks)

TABLE Q3 (2)

Activity	Time (weeks)	Cost (RM)	
	Crash	Normal	Crash
A	3	400	600
B	3	400	520
C	1	300	450
D	3	400	420
E	5	200	250
F	1	200	275

- Q4** Program Evaluation and Review Technique (PERT) is a project management tool used to analyze and represent the tasks involved in completing a project. It is particularly useful for projects where the duration of activities is uncertain or variable. PERT helps in estimating the time required to complete each activity and determining the critical path which is the sequence of tasks that will take the longest time to complete.

Describe the rationale behind the necessity for Program Evaluation and Review Technique (PERT) to establish three durations, namely the Optimistic Duration, Most Likely Duration, and Pessimistic Duration ( $t_o$ ,  $t_m$  and  $t_p$ ) in order to encompass the practical range of durations for each activity.

(6 marks)

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- Q5** Table Q5 presents the durations of all critical path activities derived from a CPM network. Utilizing the information provided in Table Q5 (Standard Normal Probabilities table in Appendix A), calculate the following:

TABLE Q5

Activity	Duration (days)		
	Optimistic ( $T_o$ )	Most likely ( $T_m$ )	Pessimistic ( $T_p$ )
A	4	6	9
D	6	10	15
G	7	11	15
H	10	20	36
M	8	10	14
O	4	5	8

- (a) The likelihood of the project being completed by the end of day 64. (2 marks)
- (b) The likelihood of the project being completed by the end of day 65. (2 marks)
- (c) The likelihood of the project being completed prior to day 60. (2 marks)
- (d) The probability that the project will finish at least 6 days early. (2 marks)
- (e) The likelihood of the project being completed with a delay of no more than 4 days. (2 marks)
- (f) The projected completion date with a confidence level of at least 97%. (2 marks)

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- Q6** The Linear Scheduling Method (LSM) is a project management technique used primarily in construction projects to plan and schedule activities along a linear path, such as highways, pipelines, or railways.
- (a) Provide a detailed step-by-step process for developing a linear schedule, including key considerations during implementation.  
(8 marks)
- (b) Discuss **TWO (2)** advantages and limitations of LSM compared to other traditional scheduling techniques.  
(4 marks)
- (c) Reflecting on your understanding of LSM, discuss how advancements in technology and software tools can enhance the application of LSM in modern construction projects. You may elaborate your answer based on these points:
- Advanced scheduling software.
  - Building Information Modelling (BIM).
  - Global Positioning System (GPS) and Geographic Information System (GIS).
  - Mobile applications.
  - Predictive analytic.
  - Drone technology.
- (12 marks)

- END OF QUESTIONS -

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APPENDIX A

Standard Normal Probabilities

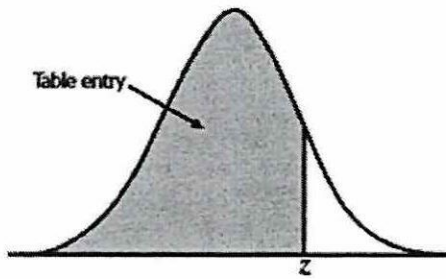


Table entry for  $z$  is the area under the standard normal curve to the left of  $z$ .

$z$	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

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