UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
(ONLINE)
SEMESTER II
SESSION 2020/2021

COURSE NAME	:	CONSTRUCTION PLANNING AND SCHEDULING
COURSE CODE	:	BFP40103
PROGRAMME CODE	:	BFF
EXAMINATION DATE	:	JULY 2021
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS. WRITE YOUR NAME & MATRIC NUMBER ON EACH PAGES OF YOUR ANSWER SCRIPT

THIS QUESTION PAPER CONSISTS OF **EIGHT (8)** PAGES

TERBUKA

Q1   Typically, construction project life cycle for conventional approach can be divided into 4 phases namely; planning, design, tendering, and construction.

   (a)   State **ONE (1)** example each for off-site and on-site activities that normally executed by the contractors.

(1 mark)

   (b)   The Johor Public Work Department (JKR) has initiated a new infrastructure project here in Batu Pahat, Johor. As a Civil Engineer for that project, you are responsible to perform the activity planning and scheduling so that the project will complete within the targeted time frame. Discuss **TWO (2)** examples of activities required in the project planning and scheduling for each phase of the construction project.

(6 marks)

Q2   You have been assign to complete the construction of a multipurpose hall here in Batu Pahat, Johor within the stipulated time. Based on the information given in **Table Q2**, perform the following:

   (a)   Develop an Arrow Diagram Network (ADM) for the project and perform the Critical Path Method (CPM) calculation to determine the ES, EF, LS, and LF for all activities and also the total project duration. Show the critical activities in your network.

(10 marks)

   (b)   Calculate the total float for each activity in the project.

(2 marks)

   (c)   Draw a bar chart and Physical S-Curve based on the calculation in **Q2 (a)** and **Q2 (b)**.

(8 marks)

Q3   Crashing a project is the process of accelerating an activity or multiple activities to shorten the overall duration of a project. **Table Q3 (a)** shows a list of construction activities required to complete a bungalow construction project for Mr. Han.

   (a)   Briefly discuss the steps involved in the process of crashing the project duration.

(4 marks)

   (b)   Based on **Table Q3 (a),** determine the duration required to complete the works and show the critical path for the project.

(5 marks)

   (c)   Mr. Han plans to complete the renovation work in 25 weeks. By using the information given in **Table Q3 (b)**, demonstrate the crashing steps required and analyse its impact on the cost of the project.

(9 marks)

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Q4   (a)   Explain why does Program Evaluation and Review Technique (PERT) requires setting of three durations, i.e. Optimistic Duration, Most Likely Duration and Pessimistic Duration $(t_o,\ t_m$ and $t_p)$ to constitute the practical range of the duration for each activity.

(4 marks)

(b)   All Good Sdn. Bhd. is considering a tender on Construction of Two Storey Office at Simpang Renggam, Johor. The activities required to complete the project are shown in **Table Q4**. Based on the information given;

(i)   Construct the Precedence Network Diagram (PDM) for the project and perform the Critical Path Method (CPM) calculation based on the most likely durations.

(5 marks)

(ii)   Find the approximate probability that the project will be completed within 55 weeks.

(4 marks)

(iii)   There is a penalty of RM 50,000 if the project cannot be completed within 52 weeks. As a director of the company, you will consider pursuing a tender if at least 75% chances of meeting the dateline. Justify whether you will proceed with the tender or not.

(4 marks)

Q5   **Table Q5** tabulates the durations of all five (5) critical path activities from a CPM network. Based on data given in **Table Q5**, calculate the followings:

(a)   The probability that the project will finish by end of day 64.

(b)   The probability that the project will finish by end of day 65.

(c)   The probability that the project will finish before day 60.

(d)   The probability that the project will finish at least 6 days early.

(e)   The probability that the project will finish in not more than 4 days late.

(f)   The completion date with at least a 97% confidence level.

(12 marks)

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Q6   (a)   From the given information in table below, determine how many paths exist through this project's network diagram.

Activity	Duration (week)	Predecessors
A	1	-
B	6	-
C	6	A and B
D	11	B
E	11	C and D
F	5	E
G	4	F

(2 marks)

(b)   Referring to the information given in **Q6 (a),** identify the project's critical path.

(1 marks)

(c)   Referring to the information given in **Q6 (a),** identify the shortest period of time (in week) in which this project may be completed.

(2 marks)

(d)   While reviewing your project network diagram, you note that an activity has an Early Start time of 3 days and a Late Start time of 12 days. How much float does this activity have?

(2 marks)

Q7   To achieve a perfect contract and corporate objectives, it requires a detailed and well-organised planning. The responsibilities and related elements of every project parties and project matters should be determined. You have been appointed as planning engineer for a new MRT project here in Batu Pahat. With relevant examples:

(a)   Discuss **THREE (3)** outcomes than can be achieved from an effective project planning.

(6 marks)

(b)   Discuss **TWO (2)** steps in achieving good scheduling.

(5 marks)

(c)   Line of balance is a scheduling technique that most understood and used widely. Briefly discuss the **TWO (2)** advantages and **TWO (2)** disadvantages of this planning technique.

(8 marks)

-END OF QUESTIONS-

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TABLE Q2: Data for a Construction Project

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

FINAL EXAMINATION

TABLE Q3 (a)

Activity	Successor	Duration (weeks)
A	B,C	12
B	D,E	8
C	D,E	4
D	G	12
E	F	4
F	G	4
G	-	4

TABLE Q3 (b)

Activity	Time (weeks)	Cost (RM)	
	Crash	Normal	Crash
A	7	3,000	5,000
B	5	2,000	3,500
C	3	4,000	7,000
D	9	50,000	71,000
E	1	500	1,100
F	1	500	1,100
G	3	15,000	22,000

FINAL EXAMINATION

SEMESTER/ SESSION	: SEM II / 2020/2021
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TABLE Q4

Activity	Predecessors	Optimistic Duration (weeks)	Most Likely Duration (weeks)	Pessimistic Duration (weeks)
START	-			
A	START	12	12	12
B	START	15	21	39
C	A	12	15	18
D	B	18	27	36
E	C	12	18	24
F	E	2	5	14
FINISH	D,F			

TABLE Q5

Activity	Duration (days)		
	Optimistic (To)	Most likely (Tm)	Pessimistic (Tp)
A	4	6	9
D	6	10	15
G	7	11	15
H	10	20	36
M	8	10	14
O	4	5	8

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Standard Normal Probabilities
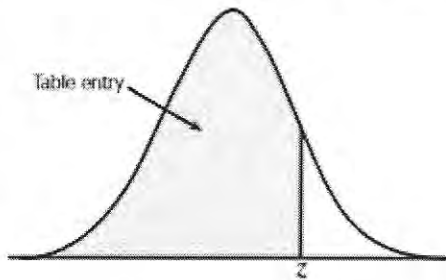
Table entry

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