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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2014/2015**

COURSE NAME	:	CONSTRUCTION PLANNING AND SCHEDULING
COURSE CODE	:	BFP 40103
PROGRAMME	:	BACHELOR OF CIVIL ENGINEERING WITH HONOURS
EXAMINATION DATE	:	JUNE 2015 / JULY 2015
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF SIX (6) PAGES

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- Q1** (a) Describe **two (2)** responsibilities of owner and contractor in project planning and scheduling in order to ensure the successful of a project.

(4 marks)

- (b) The Work Breakdown Structure (WBS) breaks a project down into progressively more detailed levels, while Organizational Breakdown Structure (OBS) detailed out peoples participated in the project.

Using appropriate diagram(s), explain how WBS can assist in organizing the project's OBS before a project start.

(7 marks)

- (c) On the network diagram created in **Figure Q1**,

- (i) Calculate the Early Start dates (ES), Early Finish dates (EF), Late Start dates (LS) and Late Finish dates (LF).

(6 marks)

- (ii) Determine the critical path(s) activities.

(1 mark)

- (iii) Construct a complete Gantt-chart from the network analysis for project reporting.

(7 marks)

- Q2** (a) Project Controlling is the tools used by management in planning their objectives, tracking the organization and responsibilities, providing substance to the implementation process, reporting the status and variances to assist management in its control and, if necessary for project re-planning.

List **five (5)** main objectives of project controlling in project planning.

(5 marks)

- (b) As the main contractor, your company has outsourced the masonry works to a mason sub-contractor to build an exterior wall from 8-inch blocks (face dimension including mortar joint = 8 inch by 16 inches). The wall is 82-feet long and 8-feet height.

According to the contract, the sub-contractor must finish the wall in 3 days and get paid RM4 per block. At the end of day-1, the sub-contractor has installed 220 blocks and gets paid (including overhead and profit) amounting RM836.

- (i) As a Project Manager, you need to analyze the situation using earned value analysis method, which include determining the BCWP, ACWP, BCWS, CV, SV, CPI and SPI for the project. In the calculation, use 1 feet equal to 12- inch.

(10 marks)

(ii) Report the project status. If the work continues as the same pace and pattern, forecast the project completion duration and cost at completion. (6 marks)

(iii) Draw the S-curve of the project showing the schedule and cost variances. (4 marks)

Q3 (a) Briefly explain why does PERT requires to set three durations, Optimistic Duration, Most Likely Duration and Pessimistic Duration (T_o , T_m and T_p) to constitutes the practical range of the duration for each activity? Provide example(s) to strengthen your answer. (5 marks)

(b) Using the data in **Table Q3**, perform the crashing program for the project by doing the following:

(i) Generate the network diagram for the project using Precedence Diagram Method (PDM). (3 marks)

(ii) Calculate the least cost and crash durations for the project. (12 marks)

(iii) Calculate the total cost associated with each duration. Indirect (overhead) cost is RM100 per day. (5 marks)

Table Q3: Cost and Durations for Crashing Program

Activity	Predecessor	Duration (days)		Cost (RM)	
		Normal	Crash	Normal	Crash
A	-	7	5	500	640
B	A	6	5	550	630
C	A	8	5	800	935
D	B	10	7	1,200	1,440
E	B, C	6	4	600	700
F	C	4	3	500	590
G	D, F	4	2	700	1,000
H	E, F	7	4	650	950
I	G, H	2	2	300	300

- Q4** (a) Explain briefly the difference between Resource Leveling and Resource Smoothing in planning. Give examples to strengthen your answer. (10 marks)
- (b) **Table Q4(a)** tabulated the durations of all six (6) critical path activities from a CPM network.

Table Q4(a): Optimistic, Most Likely and Pessimistic Duration

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

Based on data given in **Table Q4(b)**, assess the following;

- i) The probability that the project will finish by end of day 64.
- ii) The probability that the project will finish by end of day 65.
- iii) The probability that the project will finish before day 60.
- iv) The probability that the project will finish at least 6 days early.
- v) The probability that project will finish no more than 4 days late.
- vi) The completion date with at least a 97% of confidence level.

(15 marks)

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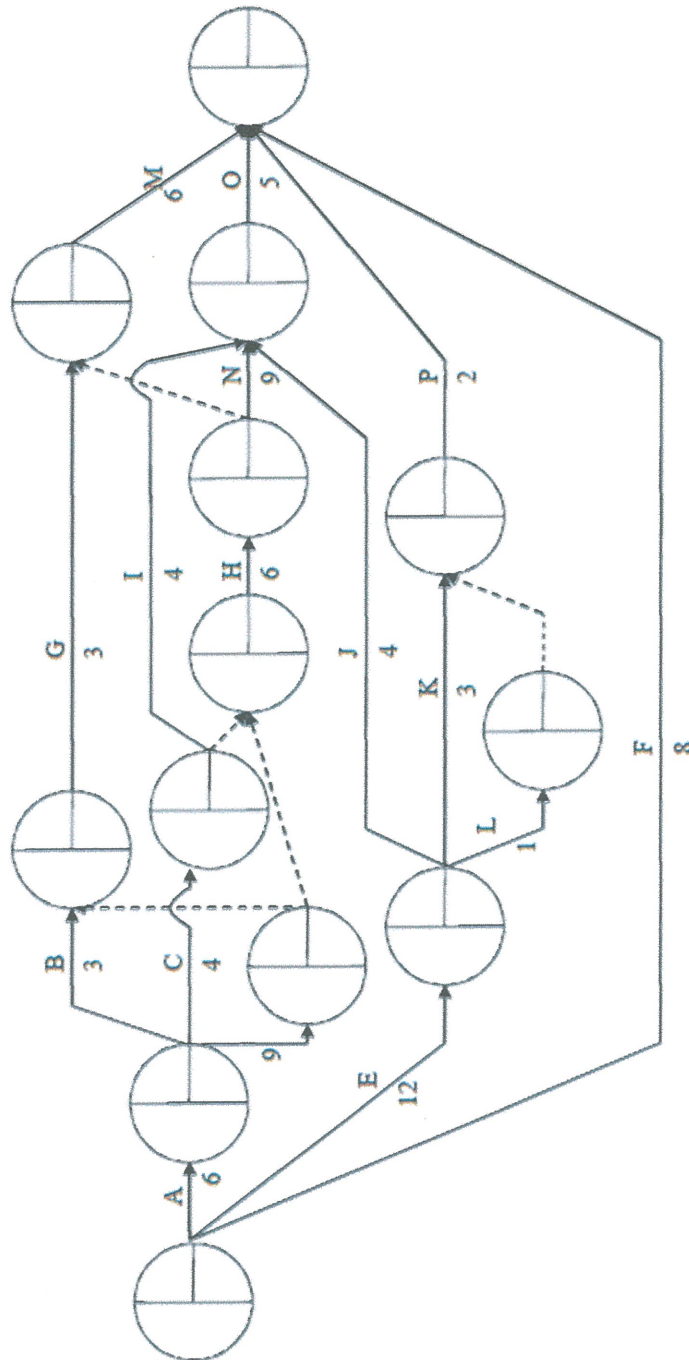


FIGURE Q1



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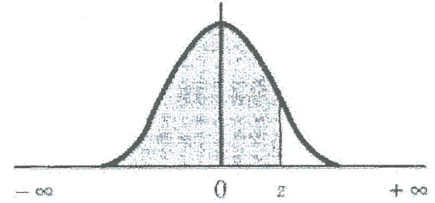
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TABLE Q4(b): Cumulative Probability of the Standard Normal Distribution

CUMULATIVE PROBABILITIES OF THE NORMAL DISTRIBUTION (AREAS UNDER THE STANDARDIZED NORMALIZED CURVE FROM $-\infty$ TO z)



z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5389	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997

