UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2011/2012

COURSE NAME	:	PLANNING, SCHEDULING AND CONSTRUCTION
COURSE CODE	:	BFP 4013
PROGRAMME	:	BFF
EXAMINATION DATE	:	JUNE 2012
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS IN **SECTION A** AND CHOOSE ANY **TWO (2)** QUESTIONS FROM **SECTION B**

THIS QUESTION PAPER CONSISTS OF **THIRTEEN (13)** PAGES

SECTION A

Q1 (a) List **five (5)** positive results from project planning in construction?

(5 marks)

(b) Refering to **Table Q1 (b)** draw the arrow network, determine the total project duration and show the critical path on your network

(10 marks)

(c) On the network diagram created in **Figure Q1 (c)**, perform Critical Path Method (CPM) calculation and draw the bar chart for the network. Early Start (ES) at activity A and B are 0, and Early Start (ES) at activity E is 24.

(10 marks)

Q2 (a) Construction workers can be classified into two group namely the supervisors and the labors. In general, the labors comprise of 90 percent to 95 percent of the total construction workers.

Explain **five (5)** main problems associate with the manpower resources in the construction sector.

(5 marks)

(b) **Table Q2 (b)** shows data for a real project. If only 10 labors is available at any time, plan your resouce for the project using the most suitable method.

(20 marks)

SECTION B

Q3 (a) Discuss **two (2)** results from a good practice in construction project planning and control.

(5 marks)

(b) A roofer is working to cover a 232.26m^2 roof. He must first install rafters, follows by sheathing, felt and finally shingles. He assumes that the previous tasks compose 35 percent, 20 percent, 15 percent and 30 percent of the total roofing activity. After **two (2)** days, he gets the following information on the subtasks:

Subtask	unit	Total Quantity	Installed Quantity
Rafters	NO	150	102
Sheathing	SF	252.7	111.48
Felt	SQ	27.2	10
Shingles	SQ	27.2	5

*No=number, SF=square feet, SQ (square) is 100 square feet; a unit used mostly in roofing jobs

(i) Estimate the percent complete for the roofing activity as an individual activity and as an entire project.

(10 marks)

(ii) In your opinion, when the roofing works could finish? Show your calculations to justify your answer.

(5 marks)

(c) State the schedule updating process in construction planning.

(5 marks)

Q4 (a) You have been appointed as a project manager for *"Construction and Completion of 10 units of Single Storey Terrace Houses in Taman Sri Gading 1"*. The project consists of preliminaries works, building works and infrastructural works (includes roads and drainage). As a project manager, you have to prepare Work Breakdown Structure (WBS) for onsite project execution based on project, activities and sub-activities.

Prepare WBS for your project up to outline level 4.

(5 marks)

(b) Based on information given in **Table Q4 (b)** and **Figure Q4 (b)**;

(i) Calculate the Cost-Slope for each activity

(5 marks)

(ii) Generate the crash durations if crashing program implements to all critical activities and assess the total cost increased after the project crashed.

(11 marks)

(iii) Plot the graph Cost (RM) Vs Duration (days) and identify the Project Crash Point (PCP).

(3 marks)

Q5 (a) Draw the network for the project as shown in **Table Q5 (a).** Perform the Critical Path Method (CPM) calculation on the basis of the most likely durations. Pick the longest three (3) paths and calculate the expected duration and standard deviation for each path. Considering all three paths, what is the duration of the project with at least a 90% confidence level? (Refer Table z in the attachment for the z value)

(20 marks)

(b) Briefly explain what is the different between "Most likely" and "Expected" durations?

(5 marks)

BAHAGIAN A

Q1 (a) Senaraikan **lima (5)** kesan positif daripada perancangan projek dalam pembinaan?
(5 markah)

(b) Merujuk kepada **Jadual Q1 (b)** lukiskan rangkaian anak panah, tentukan jumlah tempoh projek dan tunjukkan laluan kritikal.
(10 markah)

(c) Pada **Rajah Q1 (c),** laksanakan pengiraan Kaedah Laluan Kritikal (CPM) dan lukiskan carta bar untuk rangkaian tersebut. Nilai Mula Awal (ES) di aktiviti A dan B ialah 0, dan Nilai Mula Awal (ES) pada aktiviti E ialah 24.
(10 markah)

Q2 (a) Pekerja binaan boleh dikelaskan kepada 2 kumpulan iaitu penyelia dan buruh. Secara amnya, buruh terdiri daripada 90 peratus hingga 95 peratus daripada jumlah pekerja binaan.

Terangkan **lima (5)** masalah utama yang berkaitan dengan pekerja di dalam sektor pembinaan.
(5 markah)

(b) **Jadual Q2 (b)** menunjukkan data bagi sebuah projek yang sebenar. Jika hanya terdapat 10 buruh pada bila-bila masa sepanjang tempoh projek, lakukan pengarasan sumber untuk projek tersebut menggunakan kaedah yang paling sesuai.
(20 markah)

BAHAGIAN B

Q3 (a) Bincangkan **dua (2)** kesan dari amalan yang baik dalam perancangan dan kawalan projek pembinaan.

(5 markah)

(b) Tukang bumbung bekerja untuk menyiapkan 232.26m^2 bumbung. Beliau terlebih dahulu perlu memasang kerangka *(rafters)*, bahan pelapik *(sheathing)*, diikuti dengan lapisan pelindung *(felt)* dan akhirnya kepingan-kepingan bumbung *(shingles)*. Beliau telah menganggarkan pecahan kerja yang dilakukan adalah sama seperti kerja-kerja terdahulu iaitu 35 peratus, 20 pertus, 15 peratus dan 30 peratus daripada jumlah keseluruhan kerja bumbung. Selepas dua hari, beliau mendapat maklumat berikut:

Subtask	unit	Jumlah Kuantiti	Kuantiti Dipasang
Kerangka *(rafters)*	NO	150	102
Bahan Pelapik *(sheathing)*	SF	252.7	111.48
Lapisan Pelindung *(Felt)*	SQ	27.2	10
Kepingan bumbung *(shingles)*	SQ	27.2	5

* NO = bilangan, SF = kaki persegi, SQ (persegi) ialah untuk setiap 100 kaki persegi

(i) Anggarkan peratus siap untuk kerja-kerja diatas secara individu dan secara keseluruhan projek.

(10 markah)

(ii) Pada pandangan anda, bilakah kerja-kerja tersebut akan siap. Tunjukkan pengiraan untuk menyokong jawapan anda?

(5 markah)

(c) Terangkan proses pengemaskinian jadual dalam perancangan pembinaan.

(5 markah)

Q4 (a) Anda telah dilantik sebagai pengurus projek untuk projek "Membina dan Menyiapkan 10 unit Rumah Teres Setingkat di Taman Sri Gading 1". Projek tersebut terdiri daripada kerja-kerja permulaan, kerja bangunan dan infrastruktur (termasuk jalan raya dan perparitan). Sebagai pengurus projek, anda perlu menyediakan Struktur Pecahan Kerja (WBS) bagi pelaksanaan projek di lokasi yang berdasarkan projek, aktiviti dan sub-aktiviti.

Bentukkan Struktur Pecahan Kerja (WBS) untuk projek anda sehingga tahap 4.

(5 markah)

(b) Berdasarkan maklumat yang diberi dalam **Jadual Q4 (b)** dan **Rajah Q4 (b)**;

(i) Kirakan Cerun-Kos untuk setiap aktiviti.

(5 markah)

(ii) Tunjukkan tempoh pemendekan jika kaedah pemedekan diaplikasi kepada setiap aktiviti kritikal dan hitung kenaikan kos serta jumlah pertambahan kos selepas program kerja dipendekan.

(12 markah)

(c) Plot graf Kos (RM) melawan Tempoh (hari) dan didalam graf tersebut tunjukkan *Project Crash Point (PCP)*.

(3 markah)

Q5 (a) Lukiskan rangkaian kerja bagi projek seperti yang ditunjukkan dalam Jadual **Q5 (a)**. Lakukan pengiraan Kaedah Laluan Kritikal (CPM) menggunakan jangka masa yang paling mungkin *(most likely durations)*. Pilih **tiga (3)** laluan yang paling panjang dan kirakan jangkaan tempoh dan sisihan piawai bagi setiap laluan. Dengan melihat kepada ketiga-tiga laluan tersebut, berapakah tempoh projek dengan sekurang-kurangnya 90 peratus tahap keyakinan? (Rujuk Jadual z pada lampiran untuk nilai z)

(20 markah)

(b) Terangkan dengan ringkas apakah perbezaan diantara "Tempoh Paling Mungkin" *(Most likely Duration)* dan "Tempoh Jangkaan" (*Expected Duration)?*

(5 markah)

Nota: Sila rujuk ke soalan versi bahasa Inggeris jika terdapat sebarang kekeliruan
Note: Please refer to the English version of the question if there is any confusion

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TABLE Q1 (b)

Job No	Job Description	Immediate Predecessor	Duration (weeks)
0	Purchase Site	-	16
1	Prepare Blueprint	0	6
2	Excavation	1	4
3	Foundations and Basement Walls	2	3
4	Frame	3	5
5	Electrical Wiring	4	2
6	Insulate	4	1
7	Roofing	4	2
8	Ductwork and Plumbing	6	4
9	Drywall Installation	5,7,8	6
10	Install Sliding	7	4
11	Exterior Painting	10	3
12	Interior Painting	9	4
13	Carpeting	12	2
14	Install Interior Fixtures	13	7
15	Install Exterior Fixtures	11	2
16	Move-In	14,15	1

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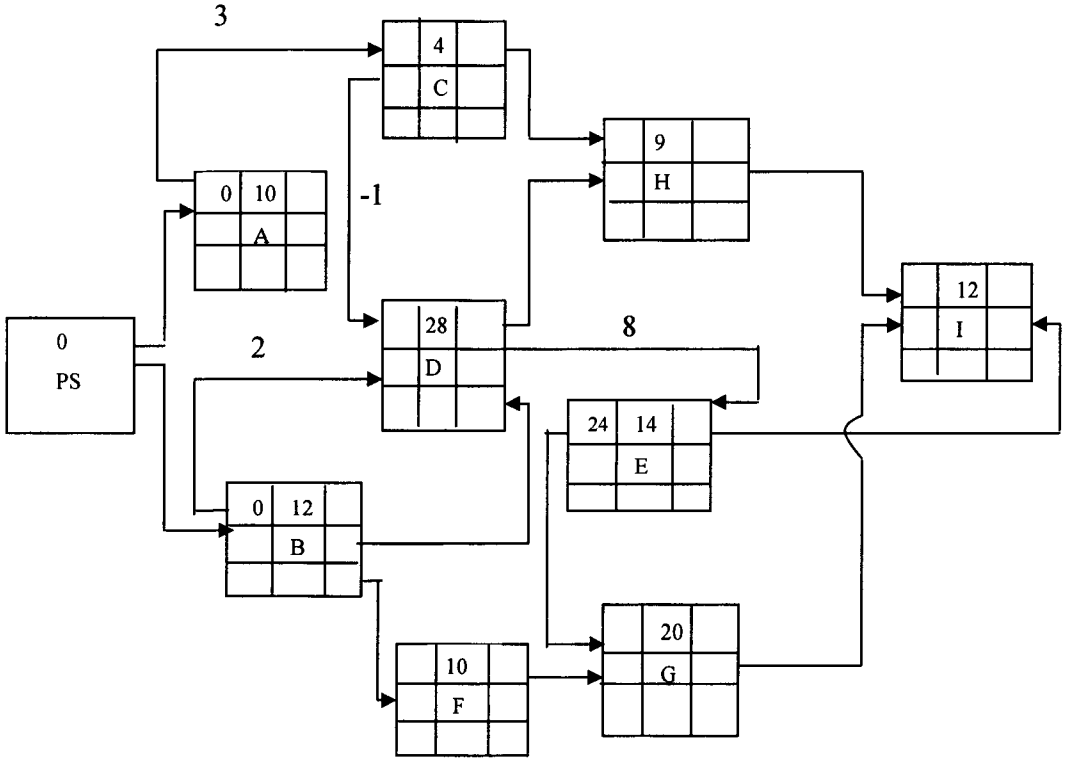

FIGURE Q1 (c)

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TABLE Q2(b)

Activity	Activity Description	Duration (Days)	IPA	Relationship	Laborers
A	Excavation & Foundation	6	-		4
B	SOG	3	A		3
C	Framing	10	B		4
D	Plumbing	4	B		2
E	Electrical Wiring	3	C	SS	3
F	Drywall	5	C	SS	3
G	HVAC rough-in	3	C	SS	4
H	Roof	5	C		3
I	Paint	4	F		2
J	HVAC finish	2	G,H		2
K	Flooring	4	D,I		3
L	Electrical Finish	1	E,H		2
M	Punch List & Cleanup	1	J,K,L		2

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TABLE Q4 (b)

Activity	IPA	Duration (days)		Cost (RM)	
		Normal	Crash	Normal	Crash
A	-	5	4	770	900
B	-	3	2	660	700
C	A	7	4	800	1070
D	A,B	4	3	1000	1110
E	B	6	4	800	920
F	C,D	6	5	560	630
G	D	5	3	700	810
H	F	8	4	1000	1260
I	E,G	4	3	500	580
J	H,I	3	2	400	600

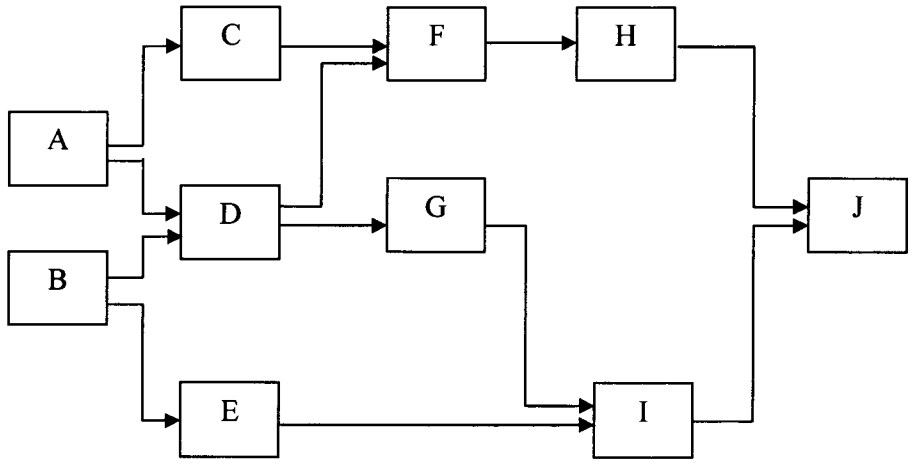

FIGURE Q4 (b)

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TABLE Q5 (a)

Activity	IPA	Duration (Days)		
		Optimistic (To)	Most Likely (Tm')	Pessimistic (Tp)
A	-	4	6	11
B	-	3	4	6
C	-	6	9	15
D	A,B	3	4	11
E	B	5	7	10
F	D	4	5	8
G	D,E	7	10	16
H	C,F,G	6	8	10
I	C,G	3	3	5
J	H,I	2	2	2

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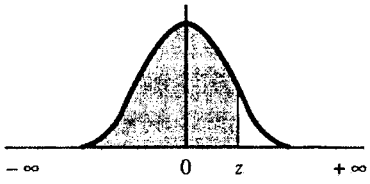
Table Z: Cumulative Probability of the Standard Normal Distribution

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