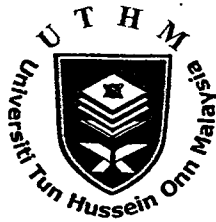


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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2012/2013**

COURSE NAME : PLANNING, SCHEDULING AND CONSTRUCTION

COURSE CODE : BFP 4013/ BFP 40103

PROGRAMME : 4BFF

EXAMINATION DATE : DECEMBER 2012/JANUARY 2013

DURATION : 3 HOURS

INSTRUCTION :
1. ANSWER ALL QUESTION IN PART A
2. CHOOSE ANY **THREE (3)** QUESTIONS FROM PART B.
3. ATTACH APPENDIX I, II AND IV WITH YOUR ANSWER BOOKLET (IF NECESSARY)

THIS QUESTION PAPER CONSISTS OF SEVENTEEN (17) PAGES

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PART A

Q1 (a) State the reasons 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.

(5 marks)

(b) **Table Q1 (b)** tabulated the durations of all five (5) critical path activities from a CPM network.

Table Q1 (b): 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 Q1 (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)

- Q2 (a)** Accelerating a program/activity in construction may cause the contractor to spend more money to done their job quickly. Define what “Accelerating” a project is and discuss **two (2)** reasons why would a project manager (or a contractor) accelerate a project.
- (5 marks)
- (b)** Perform the crashing program for project given in **Table Q2 (b)**. Analyze the normal, least-cost and crash durations for the project and calculate the cost associated with each duration. Indirect (overhead) costs are RM120.00 per day.

Table Q2 (b): Cost and Durations for Crashing Program

Activity	IPA	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

(15 marks)

PART B

- Q3 (a)** Project planning is a prerequisite to project scheduling and it is more difficult to accomplish planning than scheduling.
- (i) State the best method used to perform planning and scheduling for construction. (2 marks)
 - (ii) Describe **three (3)** key principles for planning and scheduling. (3 marks)
 - (iii) Generate the physical S-Curve for planning and actual progress of a project based on information given in **Figure Q3 (a)**. (5 marks)
- (b)** Work breakdown structure (WBS) describes the work elements of a project in a logical hierarchy.
- (i) Explain the importances of WBS. (2 marks)
 - (ii) You have been appointed as a project manager for "*Construction and Completion of Multipurpose Hall and 2 Blocks of 4-Storey Quarters for JKR Labuan*". The project consists of preliminaries works, building works and infrastructural works. As a project manager, you have to prepare Work Breakdown Structure (WBS) up to outline Level 4 for onsite project execution based on project, activities and sub-activities. (8 marks)

Q4 Project control is a system used to evaluate or make a comparison between actual and planning achievement.

- (a) Describe **four (4)** methods use in project controlling. (5 marks)
- (b) The total cost for project shown in **Table Q4 (b)** is RM 15,000. Identify the percent complete value by using Weighted Unit method foe entire project.

Table Q4 (b): Weighted Unit Method

Activity	Total cost	Cost to date
	RM	RM
Initial configurations	1,040	1,040
Initial design calculations	2,600	2,600
Preliminary layouts	3,100	2,800
Final calculations	1,060	820
CADD Drawing	5,720	1,050
Design approval	1,480	0
Total	15,000	

(5 marks)

- (c) The activity and cost to complete a project within 4 months as shown in **Figure Q4 (c)**. After 1 ½ months, the following result has been accomplished with a total cost RM 8,000:

Activity A and B (100% completed).
 Activity C (50% completed).

Activity	Cost	Month 1	Month 2	Month 3	Month 4
A	RM 2,000				
B	RM 1,000				
C	RM 6,000				
D	RM 2,000				
E	RM 7,000				
F	RM 9,000				
G	RM 3,000				
H	RM 10,000				

Figure Q4 (c)

- (i) Analyze an earned value analysis to determine schedule variance and cost variance. (8 marks)
- (ii) In your opinion, what is the status of the project at the end of the project duration? Justify your answer. (2 marks)

- Q5 (a)** List of activities that are required to complete a project is shown in **Table Q5 (a)**.

Table Q5 (a): Data for a Project

Item	Activity	Duration (day)	Predecessor
1	A	3	Start
2	B	7	A
3	C	5	A, H, K
4	D	2	C
5	E	3	D
6	F	1	A, H, K
7	G	1	F
8	H	10	Start
9	I	12	A, H, K
10	J	1	I, L
11	K	1	Start
12	L	11	K
13	End	-	B, E, G, J

Based on the above data:

- (i) Develop an arrow diagram network for the project and perform the Critical Path Method (CPM) calculation on the diagram. (8 marks)
- (ii) Assess total float for activity D and F. (2 marks)
- (b) Activities that are required to complete a project in Kuala Lumpur as shown in **Figure Q5 (b) (i)**. Based on the diagram given;
- (i) Prepare the schedule in a tabular form showing an early start, early finish, late start and late finish for each activity. (8 marks)
- (ii) If the project start date is on 3rd December 2012, evaluate the project finish date based on project working calendar provided in **Figure Q5 (b) (ii)**. Consider Sunday as non-working day for the project. (2 marks)
- Q6 (a)** Discuss **two (2)** reasons why contractor needs to level their human resources in construction projects? (5 marks)
- (b) Based on network diagram given in **Figure Q6 (b)**, manually level your resources with a maximum of eight (8) laborers per day. (15 marks)

TERJEMAHAN BAHASA MALAYSIA

BAHAGIAN A

- S1 (a) Nyatakan sebab-sebab mengapa analisis PERT memerlukan tiga jenis jangkamasa iaitu Tempoh masa Optimistik, Tempoh masa Lazim dan Tempoh masa Pesimistik (T_o , T_m and T_p) untuk menentukan tempoh masa paling praktikal bagi setiap aktiviti? (5 markah)
- (b) **Jadual S1(b)** menunjukkan tempoh masa yang diperlukan untuk kesemua lima (5) aktiviti kritikal daripada sebuah rangkaian laluan kritikal bagi sebuah projek.

Jadual S1 (b): Jangkamasa Optimistik, Jangkamasa Lazim dan Jangkamasa Pesimistik

Aktiviti	Tempoh Masa (hari)		
	Optimistik (T_o)	Lazim (T_m)	Pesimistik (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

Berdasarkan data yang diberikan dalam **Jadual S1 (b)**, nilaikan yang berikut;

- (i) Kebarangkalian projek akan tamat di akhir hari yang ke-64.
- (ii) Kebarangkalian projek akan tamat di akhir hari yang ke-65.
- (i) Kebarangkalian projek akan tamat sebelum hari yang ke-60.
- (ii) Kebarangkalian projek akan tamat sekurang-kurangnya 6 hari lebih awal.
- (iii) Kebarangkalian projek akan tampat tidak lebih dari 4 hari lewat.
- (iv) Tarikh siap pada tahap keyakinan sekurang-kurangnya 97%.

(15 markah)

- S2 (a) Mempercepatkan program kerja/aktiviti dalam pembinaan boleh menyebabkan kontraktor perlu membelanjakan lebih banyak wang untuk menyelesaikan tugas mereka dengan cepat. Terangkan maksud "mempercepatkan" projek dan bincangkan **dua (2)** alasan mengapa seorang pengurus projek (atau kontraktor) perlu mempercepatkan projek mereka?

(5 markah)

- (b) Laksanakan kaedah pemendekan program kerja untuk projek yang diberikan dalam **Jadual S2 (b)**. Jalankan analisis keatas kos normal, pengurangan kos dan tempoh pemendekan bagi projek tersebut dan tentukan kos sebenar projek berdasarkan tempoh siap yang baru. Kos tidak langsung (overhead) bagi projek ini adalah RM120.00 sehari.

Jadual S2 (b): Kos dan Tempohmasa untuk Pemendekan Tempoh Kerja

Aktiviti	IPA	Tempoh Masa (hari)		Kos (RM)	
		Normal	Pemendekan	Normal	Pemendekan
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

(15 markah)

BAHAGIAN B

- S3 (a) Perancangan projek adalah prasyarat bagi penjadualan projek dan proses perancangan adalah lebih rumit untuk dilaksanakan berbanding penjadualan.
- (i) Nyatakan kaedah paling tepat yang boleh digunakan dalam melaksanakan perancangan dan penjadualan dalam pembinaan. (2 markah)
 - (ii) Nyatakan **tiga (3)** prinsip utama bagi perancangan dan penjadualan projek. (3 markah)
 - (iii) Sediakan Lengkuk-S fizikal bagi perancangan dan kemajuan kerja sebenar berdasarkan maklumat yang dibekalkan dalam **Rajah Q3 (a)**. (5 markah)
- (b) Struktur pecahan kerja (WBS) menerangkan elemen-elemen kerja bagi sesebuah projek dalam bentuk hierarki logik.
- (i) Terangkan kepentingan struktur pecahan kerja (WBS). (2 markah)
 - (ii) Anda telah dilantik sebagai pengurus projek untuk projek “Membina dan Menyiapkan Sebuah Dewan Serbaguna dan 2 Buah Blok Kuarters 4 Tingkat untuk JKR Labuan”. Projek ini merangkumi kerja-kerja awalan, kerja-kerja bangunan dan kerja-kerja pembangunan infrastruktur. Sebagai seorang pengurus projek, anda dikehendaki menyediakan Struktur Pecahan Kerja (WBS) bagi pelaksanaan projek tersebut ditapak berdasarkan projek, aktiviti dan sub-aktiviti sehingga WBS Tahap 4. (8 markah)

S4 Kawalan Projek merupakan satu sistem yang digunakan untuk menilai atau membuat perbandingan diantara perancangan dengan pencapaian sebenar di tapak.

- (a) Berikan empat (4) kaedah yang lazim digunakan dalam pengawalan projek. (5 markah)
- (b) Jumlah keseluruhan kos bagi projek yang ditunjukkan dalam Jadual S4 (b) adalah RM 15,000. Tentukan nilai peratus siap bagi projek tersebut secara keseluruhan menggunakan kaedah pemberat wajaran (*Weighted Unit Method*).

Jadual S4 (b): Kaedah Pemberat Wajaran (*Weighted Unit Method*)

Aktiviti	Jumlah Kos	Kos Semasa
	RM	RM
Konfigurasi Awalan	1,040	1,040
Rekabentuk Awal Pengiraan	2,600	2,600
Susun atur Awalan	3,100	2,800
Pengiraan Akhir	1,060	820
Lukisan CADD	5,720	1,050
Kelulusan Rekabentuk	1,480	0
Jumlah	15,000	

(5 markah)

- (c) Aktiviti dan kos yang diperlukan untuk menyiapkan sebuah projek dalam tempohmasa 4 bulan ditunjukkan dalam Rajah S4 (c) dibawah. Selepas 1 ½ bulan, kemajuan kerja berikut telah dicapai dengan jumlah kos yang terlibat ialah sebanyak RM 8,000:

Aktiviti A, B dan D: 100% siap.

Aktiviti E: 50% siap.

Aktiviti	Kos	Bulan ke-1	Bulan ke-2	Bulan ke-3	Bulan ke-4
A	RM 2,000	■			
B	RM 1,000	■			
C	RM 6,000		■		
D	RM 2,000		■		
E	RM 7,000		■	■	
F	RM 9,000			■	
G	RM 3,000			■	
H	RM 10,000				■

Rajah S4 (c)

- (i) Lakukan analisa keatas nilai yang diperolehi (*earned value*) untuk mendapatkan perbezaan jadual (*schedule variance*) dan perbezaan kos (*cost-variance*) bagi projek diatas. (8 markah)
- (ii) Pada pandangan anda, apakah status projek di akhir tempoh projek? Tunjukkan justifikasi bagi jawapan anda. (2 markah)

- S5 (a) Senarai aktiviti yang diperlukan untuk menyiapkan sebuah projek ditunjukkan dalam **Jadual S5 (a)**.

Jadual S5 (a): Data bagi sebuah Projek

Item	Aktiviti	Jangka masa (hari)	Aktiviti Sebelum
1	A	3	Start
2	B	7	A
3	C	5	A, H, K
4	D	2	C
5	E	3	D
6	F	1	A, H, K
7	G	1	F
8	H	10	Start
9	I	12	A, H, K
10	J	1	I, L
11	K	1	Start
12	L	11	K
13	End	-	B, E, G, J

Berdasarkan maklumat diatas:

- (i) Bentukkan Rangkaian Anak Panah (*Arrow Diagram Network*) bagi projek diatas dan lakukan pengiraan menggunakan Kaedah Laluan Kritikal (CPM) pada rangkaian tersebut. (8 markah)
- (ii) Tentukan Nilai Jumlah Apungan (*Total Float*) untuk aktiviti D dan F. (2 markah)
- (b) Aktiviti yang diperlukan untuk menyiapkan sebuah projek pembinaan di Kuala Lumpur ditunjukkan dalam **Rajah Q5 (b) (i)**. Berdasarkan rangkaian tersebut;
- (i) Sediakan jadual yang menunjukkan Tempoh Mula Awal (ES), Tempoh Siap Terawal (EF), Tempoh Mula Terlewat (LS) dan Tempoh Siap Paling Lewat (LF) bagi setiap aktiviti. (8 markah)
- (ii) Jika projek tersebut bermula pada 3^{hb} Disember 2012, tentukan tarikh siap projek berpandukan kalender kerja yang dibekalkan dalam **Rajah Q5 (b) (ii)**. Anggapan Ahad sebagai hari kelepasan projek. (2 markah)

- S6 (a) Bincangkan **dua (2)** alasan mengapa kontraktor perlu melakukan penggarasan sumber dalam sesebuah projek pembinaan.
(5 markah)
- (b) Berdasarkan rangkaian kerja yang diberikan dalam **Rajah Q6 (b)**, lakukan penggarasan sumber secara manual berdasarkan nilai maksimum lapan (8) orang buruh sehari.
(15 markah)

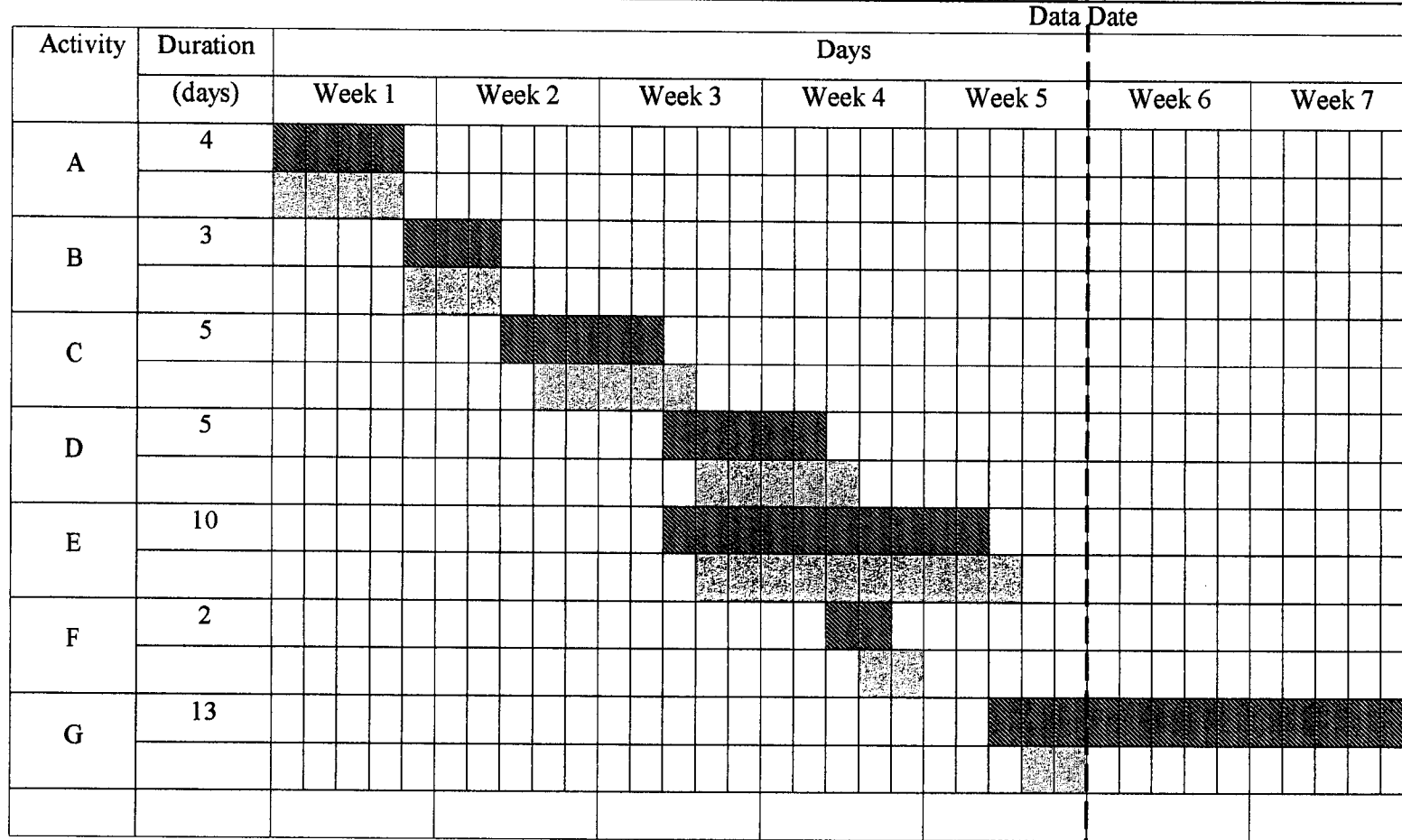
APPENDIX I

BFP4013/BFP40103

FINAL EXAMINATION


SEMESTER / SESSION : SEMI / 20122013
 COURSE : PLANNING, SCHEDULING & CONSTRUCTION

PROGRAMME: 4 BFF
 COURSE CODE : BFP 4013/BFP 40103



Name :
 Matric Number :

FIGURE Q3(a)

Remarks;

 Planning
 Actual Progress

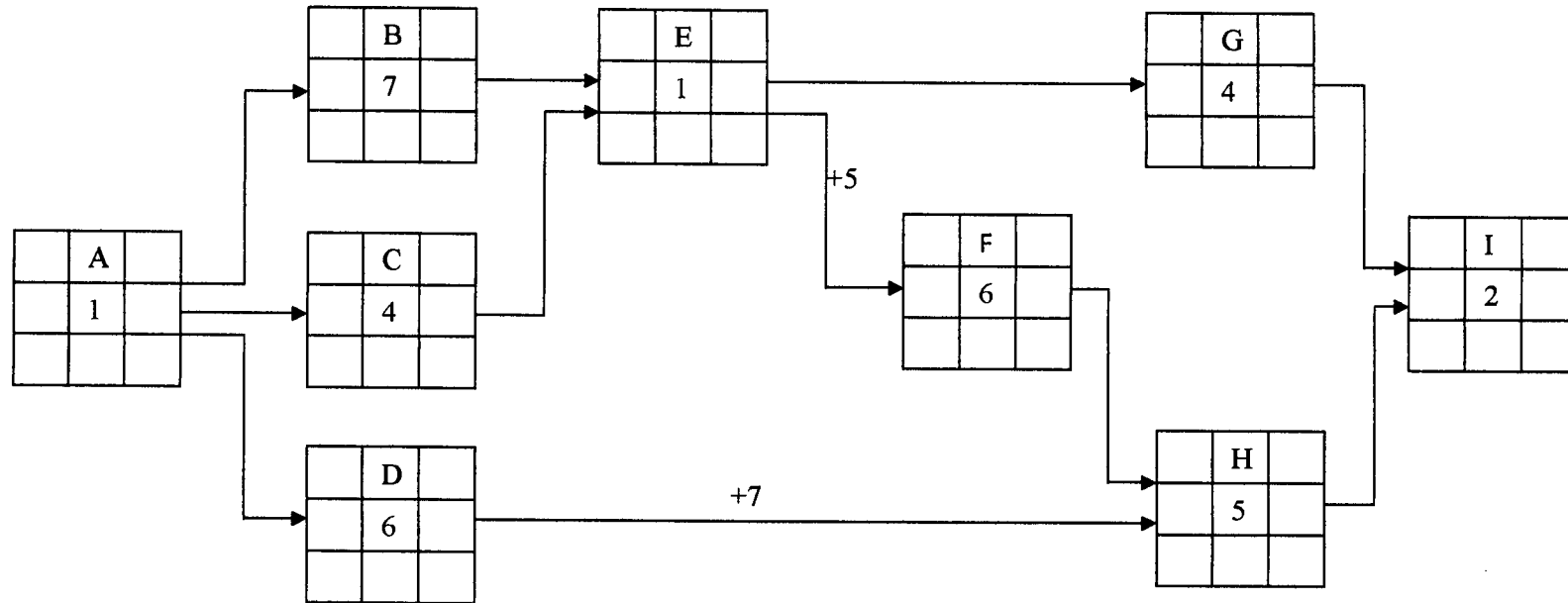
APPENDIX II

BFP4013/BFP40103

FINAL EXAMINATION

SEMESTER / SESSION : SEMI / 20122013
 COURSE : PLANNING, SCHEDULING & CONSTRUCTION

PROGRAMME: 4 BFF
 COURSE CODE : BFP 4013/BFP 40103



Name:

Matric No:

FIGURE Q5 (b) (i)

Remarks;

ES	Act	EF
	D	
LS		LF

APPENDIX III

BFP4013/BFP40103

FINAL EXAMINATION

SEMESTER / SESSION : SEMI / 20122013
 COURSE : PLANNING, SCHEDULING & CONSTRUCTION

PROGRAMME: 4 BFF
 COURSE CODE : BFP 4013/BFP 40103

Project Working Calendar

December 2012						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						
January 2013						
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

20th December 2012 : Hari Hol Almarhum Sultan Johor
 25th December 2012 : Christmas Day
 1st January 2013 : New Year
 24th January 2013 : Prophet Muhammad's Birthday (Maulidur Rasul)
 27th January 2013 : Thaipusam

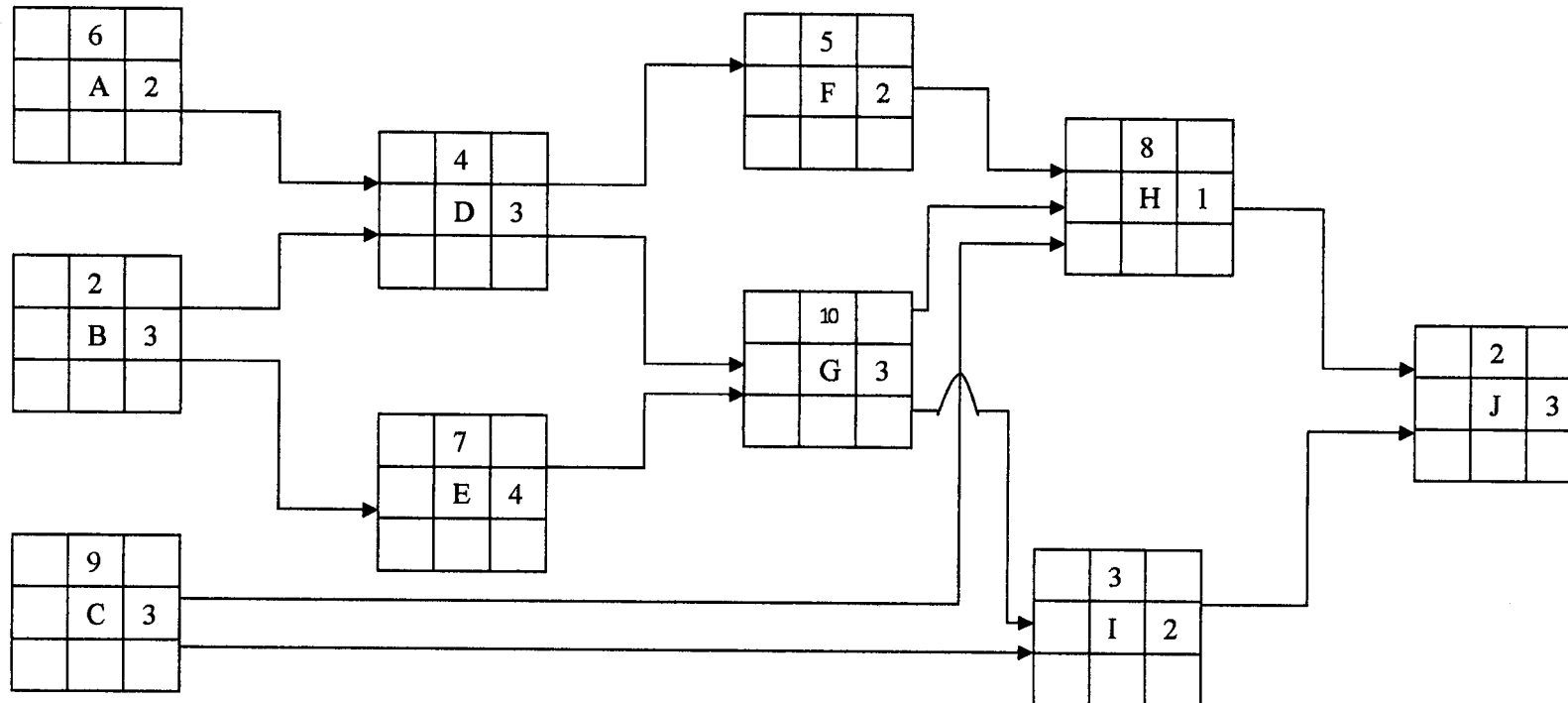
FIGURE O5 (b) (ii)

APPENDIX IV

FINAL EXAMINATION

SEMESTER / SESSION : SEMI / 20122013
 COURSE : PLANNING, SCHEDULING & CONSTRUCTION

PROGRAMME: 4 BFF
 COURSE CODE : BFP 4013/BFP 40103



Remarks;

	D	
	X	L

X= Activity
 D= Duration
 L= Labor

Name:

Matric No:

FIGURE Q6 (b)

APPENDIX V

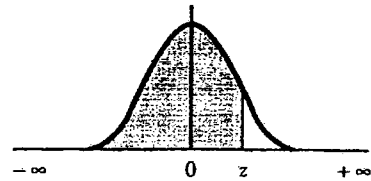
FINAL EXAMINATION

SEMESTER / SESSION : SEM I / 20122013
 COURSE : PLANNING, SCHEDULING & CONSTRUCTION

PROGRAMME: 4 BFF
 COURSE CODE : BFP 4013/BFP 40103

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