Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2015/2016

COURSE NAME	:	CONSTRUCTION PLANNING AND SCHEDULING
COURSE CODE	:	BFP 40103
PROGRAMME CODE	:	BFF
EXAMINATION DATE	:	JUNE / JULY 2016
DURATION	:	3 HOURS
INSTRUCTION	:	1) ANSWER **ALL** QUESTIONS 2) PLEASE ATTACH THE QUESTION PAPER IN YOUR ANSWER BOOKLET

THIS QUESTION PAPER CONSISTS OF **TWELVE (12)** PAGES

SECTION A

Q1 A network diagram for construction of one small project is shown in **FIGURE Q1(a).** The project started on 5th April 2016 and the contract period is 5 weeks. Based on the calendar given in **FIGURE Q1(b)** and the actual cost, actual start and finish given in **TABLE Q1**:

(a) develop a Cost vs Time S-Curve for planned and actual situation
(b) evaluate the status of project in term of cost and schedule at the end of Week 4
(c) propose your suggestion based on your answer in Q1(b).

(15 marks)

Q2 A contractor is required to complete a project with the activities as shown in **TABLE Q2**. The contractor is only able to allocate 5 manpower/day to this project except for Day-8 to Day-10 with additional 2 manpower/day. Level the manpower manually to comply with the maximum number of manpower provided by the contactor.

(10 marks)

TABLE Q2

Activity	Duration (days)	Predecessor(s)	Manpower/day
A	2	-	3
B	3	A	4
C	2	A	2
D	3	B, C (FS+2)	1
E	3	C (FS+3)	2
F	4	E (SS)	3
G	4	D	2
H	2	E, G(FF)	1
I	3	F	2
J	6	H,I	3

Q3 **FIGURE Q3** shows the critical activities of a PERT diagram. The optimistic time (a), most likely time (m), and the pessimistic time (b) are shown at the bottom of each activity. Based on the given data, compute the followings:

(a) Most likely time (t_e) for each activity.
(b) Expected time for completion a project.
(c) Standard deviation (σe) for the project.
(d) The probability that the project can be completed in 30 days.
(e) The probability that the project can be completed before day 28.
(f) The completion date at a 90% confidence level.

(5 marks)

Q4 Develop the crashing program for the following project as shown in **Table Q4** to its shortest duration up to 3 Cycles.

(5 marks)

Table Q4

Activity	Predecessor	Time		Cost (RM)	
		Normal	Crash	Normal	Difference
A	-	1	1	1,000	0
B	A	3	2	2,000	100
C	A	6	1	1,000	90
D	B	5	3	1,000	30
E	D	2	1	1,000	40
F	C,D	6	2	1,000	80
G	C	3	1	1,000	75
H	G	4	3	1,000	60
J	E,F,H	3	2	1,000	150

SECTION B

Q5 Choose the best answer.

(10 marks)

(a) Total float is the amount of time an activity may be delayed without delaying the completion date of project. Followings are the application of total float in planning and scheduling except;

A. To delay the activities with total float time
B. To manage the resources to optimum level
C. To apply in crashing the program
D. To manage the cost in construction

Based on **Table Q5(b)**, answer Question Q5(b) to Q5(e).

Table Q5(b)

Activity	Duration (days)	Successor(s)
A	2	B,C,D
B	3	E
C	4	E,F,G
D	3	G
E	2	H,I
F	3	I
G	2	I
H	3	J
I	1	J
J	4	-

(b) The duration for the project is:

A. 16 days
B. 15 days
C. 14 days
D. 18 days

(c) Choose the critical path of the project:

A. A-C-E-H-J
B. A-B-E-H-J
C. A-C-F-I-J
D. A-C-E-F-I-J

(d) Calculate the total float for Activity G.

A. 3 days
B. 4 days
C. 5 days
D. 6 days

(e) Calculate the free float for Activity I.

A. 1 day
B. 2 days
C. 3 days
D. 4 days

(f) The followings are the reasons on the importance to appreciate boundary lines in Construction Project Management (CPM), except;

A. boundary lines are able to determine the scope of works for each construction stakeholder
B. boundary lines are useful as guidance for planning and scheduling process
C. in general, boundary lines in Construction Project Management (CPM) is not indicating any communication and information flow between construction stakeholders
D. management approach differs between different construction stakeholders and phases in construction, where boundary lines helps the process.

(g) Components and functions in Construction Project Management (CPM) carry different weight of attributes. Choose the right statement regarding the matter.

A. Funtions are always exist in Contruction Project Management, while components do not.
B. They are connected with each other, where generally functions are imposed towards components to achieve desired managerial results.
C. They are connected with each other, where generally components are imposed towards functions to achieve desired managerial results.
D. Components are always exist in Construction Project Management (CPM), while functions do not

(h) What is the difference in term of planning and scheduling between client and contractor?

A. Basically, client will engage the functions within micro perspective after they were awarded the construction project, but contractor will starts from conceptualisation phase through macro perspective
B. In traditional contracting method, client is responsible for planning, while contractor is responsible for scheduling
C. Basically, contractor will engage the functions within micro perspective after they were awarded the construction project, but client will starts from conceptualisation phase through macro perspective
D. In traditional contracting method, client is responsible for scheduling, while contractor is responsible for planning

(i) Choose the correct statement:

A. Work Breakdown Structure (WBS) is developed after Critical Path Method (CPM) is conducted successfully
B. Critical Path Method (CPM) is developed after Work Breakdown Structure (WBS) is finalised thoroughly
C. Deliverable-oriented WBS is the preferred type of WBS compared to process-centred WBS
D. Construction Project Life Cycle (CPLC) supports Deliverable-oriented WBS in a much holistic manner

(j) Choose the correct statement:

A. S-curve is developed after Critical Path Method (CPM) is drafted, and maintained until Work Breakdown Structure (WBS) is completed
B. Baseline S-curve will meet Target S-curve at the end of construction project
C. Actual S-curve will meet Target S-curve at the end of construction project
D. S-curve is developed after Work Breakdown Structure (WBS) is drafted, and maintained until Critical Path Method (CPM) is completed

(k) The objectives of defining activities of construction projects are as the followings, except;

A. reduce time and cost
B. identify effective way in performing a task
C. impove productivity
D. assist in selection of capital investor

(l) What is the difference between purpose and outcome in Construction Project Management (CPM)?

	Purpose	Outcome
A.	Dictates the approach to envisage CPM	The final product of construction in a form of tangible and/or intangible result
B.	The first step in design	The final product of construction in a form of tangible and/or intangible result
C.	The final product of construction in a form of tangible and/or intangible result	Dictates the approach to envisage CPM
D.	The first step in design	Dictates the approach to envisage CPM

(m) The applications of Percentage S-Curve are as follows, except:

A. To evaluate the growth of project
B. To determine actual percentage of completed activities
C. To identify the slippage in project
D. To compare the values of cost and time during certain point of time in a project

(n) Choose the factors influencing data collection for project monitoring.

i. Clients
ii. Complexity of project
iii. Project cost
iv. Project size

A. i, ii, iii and iv
B. i, ii and iii
C. i, ii and iv
D. i, iii and iv

(o) Nowadays technology is one of the important criteria in every facet of our lives. Select how the application of technology eases the project monitoring and controlling.

A. Clients maintain their reputation by the use of technology system in monitoring the project.
B. The complexity in a construction project involves a lot of information and data which technology can simplify, store, disseminate to all construction stakeholders in an efficient way.
C. The application of technology involves higher initial cost thus not suitable to be used in small scale size of project.
D. The size of construction project usually depends on the contractor's grade which technology is currently used in higher grade of contractor.

(p) Schedule Performance Index less than 1 normally occured when:

i. Unfavourable weather condition
ii. Overstaffing of work
iii. Activities started later than planned
iv. Fewer quantities than estimates

A. i and iii
B. ii and iv
C. i, ii and iii
D. i and iii

(q) In controlling the project, two methods of schedule compression can be use namely crashing and fast-tracking. The reasons of schedule compression include the followings, except;

A. to gain a profit by spending more money in the earlier stage of project
B. to avoid a loss in delaying the project
C. to claim monetory incentive if project finish on time
D. to rectify the problems earlier

(r) Criteria of selecting activities in project crashing are as the followings, except;

A. No obstacle in providing extra manpower
B. Crashing must be done in the earlier stage of construction project
C. Choose the activities with a total float time
D. Lower cost per period gained

(s) The most appropriate reason in selecting linear scheduling method is:

A. the existence of sequence activities in a project
B. the repetitive activites in a project
C. the activities can be group into similar group of activities
D. all of above.

SECTION C

Complete the crossword puzzle in **Figure Q6** according to the statement given below.

(5 marks)

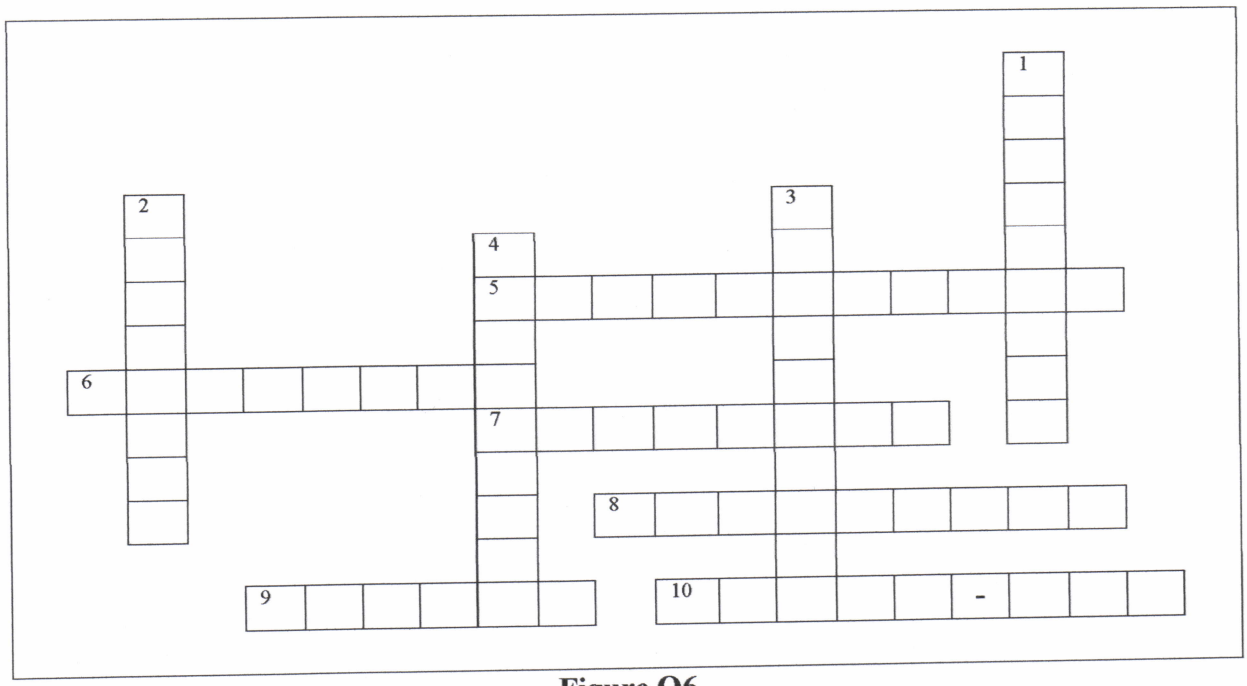

Figure Q6

1. Sufficient flexibility in addition or elimination of work scope in Work Breakdown Structure framework.
2. Estimated Cost at Completion is a _____ values of the total actual costs required to complete a project.
3. S-Curve is a display of _____ value.
4. _____ is a specific indication in construction project.
5. _____ milestone is one of project measurement and controlling method.
6. _____ variance are the differences between BCWP and BCWS.
7. Amount of time a task has been delayed from its original baseline schedule.
8. Work Breakdown Structure must be _____ so than it can be easily understood by project participant.
9. _____ value is used to monitor the progress of work and compare with accomplished work.
10. One method in collecting data for project monitoring.

-END OF QUESTIONS-

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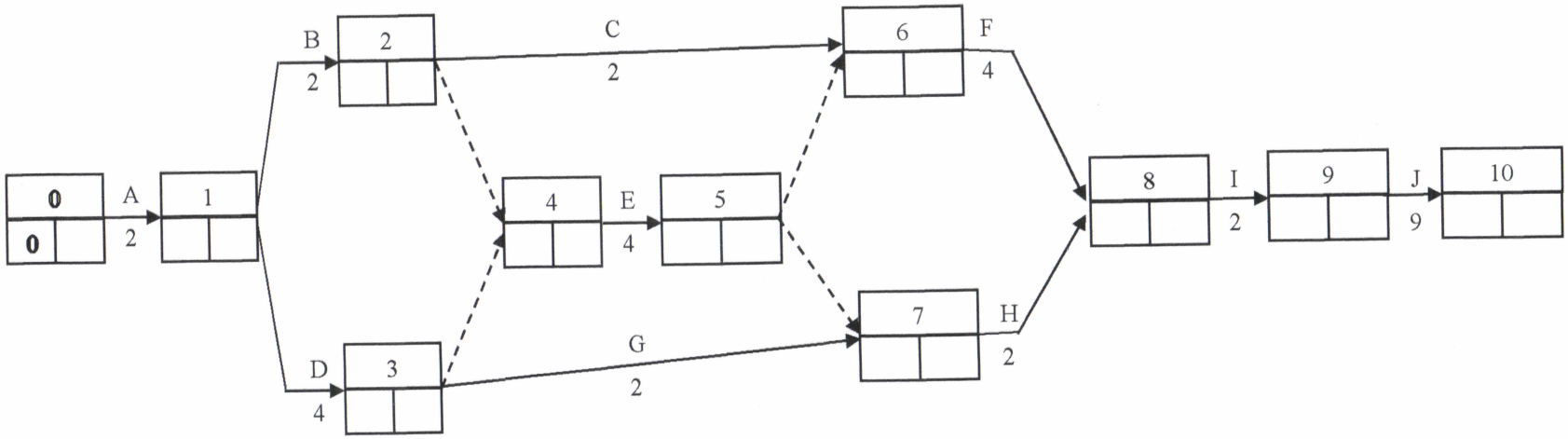

FIGURE Q1(a)

Apr-16						
M	T	W	T	F	S	S
		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			

May-16						
M	T	W	T	F	S	S
				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

Public Holiday

Working Hours :
Sunday to Thursday (8am - 5 pm)

FIGURE Q1 (b)

Task	Actual Start	Actual Finish	Baseline Cost (RM)	Actual Cost (RM)
A	05/04/16	07/04/16	1,000	1,000
B	08/04/16	09/04/16	2,000	2,000
C	12/04/16	14/04/16	600	600
D	08/04/16	14/04/16	800	900
E	15/04/16	21/04/16	400	500
F	23/04/16	28/04/16	1,500	1,500
G	14/04/16	16/04/16	3,000	2,800
H	23/04/16	27/04/16	1,000	800
I	29/04/16	30/04/16	500	600
J	03/05/16	15/05/16	4,000	4,300

TABLE Q1

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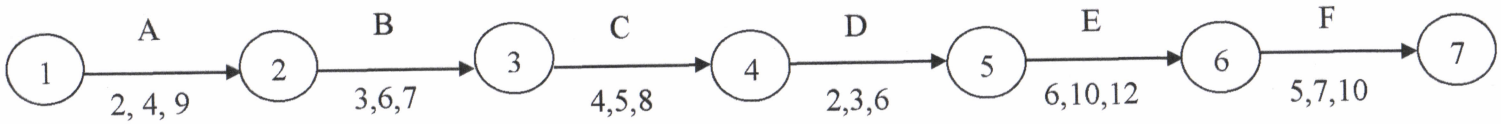

FIGURE Q3

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APPENDIX 1

Standard Normal Probabilities

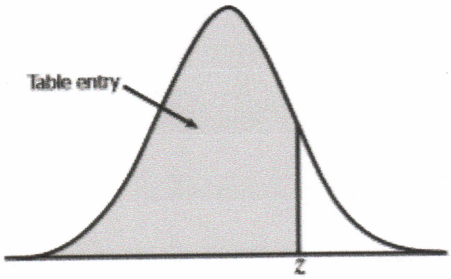

Table entry for z is the area under the standard normal curve to the left of z.

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