Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2016/2017

COURSE NAME	:	PROJECT PLANNING AND SCHEDULING
COURSE CODE	:	BPD 33903
PROGRAMME CODE	:	BPC
EXAMINATION DATE	:	JUNE 2017
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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THIS QUESTION PAPER CONSISTS OF **SEVEN** (7) PAGES

Q1 (a) Explain the importance of having a clear project scope definition for a construction project.

(3 marks)

(b) In the early stages of project development the owner must develop the main project strategy.

Describe the key elements of the project strategy.

(4 marks)

(c) Design-bid-Build is considered to be the traditional mode of procurement for construction projects. Currently the traditional procurement mode for infrastructure projects is gradually being replaced by the Design-Build approach.

(i) Differentiate between Design-bid-Build procurement approach and Design-Build procurement.

(4 marks)

(ii) Explain the effect of implementing the **TWO (2)** main forms of novated Design-Build procurement strategies on planning and scheduling of construction projects.

(6 marks)

Q2 The common approach used by construction project management teams in order to overcome project delay is to use the crashing technique. **Table Q2** provides information related to a building project of your company that is experiencing delay.

Table Q2 : Project Information

Activity	Predecessor	Normal Time (NT) (weeks)	Normal Cost (NC) (RM)	Crash Time (CT) (weeks)	Crash Cost (CC) (RM)	Crash Cost per week (CC-NC/NT-CT) (RM)
A	-	6	200	4	500	
B	A	5	300	3	600	
C	A	4	100	2	300	
D	A	8	400	4	600	
E	B,C	4	700	2	1,000	
F	C	3	200	1	300	
G	D	4	300	3	400	
H	E	3	500	2	600	
I	F,G	3	400	1	600	
J	H,I	3	200	2	500	
K	J,G	2	300	1	400	

(a) Prepare a precedence network diagram using the critical path method (CPM) for the building project according to the original project information provided in **Table Q2**.

(6 marks)

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(b) You are required to complete the project within 24 weeks. Use the crashing method in order to resolve the problem of completing the building project according to the project information provided in **Table Q2** within the required period of 24 weeks without using the splitting or multitasking techniques.

(i) Explain the slope technique in choosing the activity to crash in **Table Q2.** (3 marks)

(ii) Prepare an updated CPM diagram after crashing the project that is to be completed within a period of 24 weeks. (6 marks)

(iii) Prepare a project information table based on the 24 weeks crashed project data, including the individual activity costing and final costing. (6 marks)

Q3 (a) One of the methods that can be used for the purpose of project planning that has repetitive activities is that of Linear Scheduling. The following information in **Table Q3** below refers to a road project of 90 km length.

Table Q3: Productivity Information of Flexible Road Construction

	Activity	Productivity (km per day)	Immediately Preceding Overlapping Activity
A	Land Survey and Layout	3	-
B	Site Clearance	5	A
C	Excavation and Levelling	4	B
D	Laying of Sub-base Course & Subgrade	3	C
E	Laying of Base Course	5	D
F	Laying of Surface Course	4	E

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(i) Illustrate using graph paper based on the Velocity Diagram method to indicate clearly scheduled activities that can have a conflicting situation. (4 marks)

(ii) Prepare a revised Velocity Diagram to **Q3(a)(i)** indicating clearly the buffer between subsequent activities that needs to be reconsidered in the planning and scheduling of the road project in order to avoid conflicts. (6 marks)

(iii) Identify the estimated completion period for the project planned in **Q3(a)(ii)** that does not have conflicts. (2 marks)

(b) The material cost in Ringgit Malaysia (RM) for constructing an expressway is given by the following formula:
C = 437,2800 + (83,987)N + (175,406)L
Where: C = Material cost of constructing the highway
N = Number of lanes in the carriageway
L = Length of the proposed expressway, in km

Calculate the material cost in RM for constructing a 25 km, double carriageway, international standard urban expressway using the above formula.

(4 marks)

Q4 (a) You are the project manager for a High Rise Condominium Project (titled as: PUTRA ONE) in Putra Jaya, and you have prepared the project schedule involving the use of tower cranes as the main resource based on information in **Figure Q4**. Activity E dan F requires 2 'cranes', and activity A, B, C dan D require 1 crane each. The original resource scheduling is based on using a total of 3 cranes.

(i) Prepare a completed Critical Path Precedence Diagram for project PUTRA ONE in **Figure Q4**.

(4 marks)

(ii) Prepare the original resource schedule using **Table Q4 (a)** for project PUTRA ONE.

(4 marks)

However, two weeks before the project is to start, you are instructed by your company that one of your tower cranes that has not been installed needs to be relocated to Sepang for another high rise Condominium project (titled as: SEPANG TWO).

(iii) Analyse the revised PUTRA ONE project resource schedule using **Table Q4 (b)** to complete the project in 12 weeks using only 2 cranes. This is to be done using the parallell method for resource levelling (without activity splitting, multitasking or overtime) so that resources can be allocated effectively without exceeding resource limitations.

(6 marks)

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(b) Mr Jaafar, the owner of a proposed fishing farm wants to complete excavating 4 fish ponds in 4 weeks. The cost for excavating each pond is RM1 000. However, at the end of week 3 he has completed only 2 ponds and spent RM4 000.

(i) Analyse the schedule variance (SV) and cost variance (CV) for Mr Jaafar's project based on week 3 analysis.

(6 marks)

(ii) Sketch a graphical representation of the various S-curves for the above project based on week 3 analysis.

(6 marks)

Q5 Construction project management tools and techniques are used to achieve higher levels of performance with respect to time, cost and quality.

(a) Critical Path Method (CPM) technique is a tool to assist in the planning and scheduling management of projects.

(i) List **THREE (3)** advantages of the CPM technique.

(3 marks)

(ii) List **TWO (2)** disadvantages of the CPM technique.

(2 marks)

You are the Project Manager for a Housing Development Project consisting of split-level two storey units (with split-level car garage at lowest level) on a hillslope scheduled to be completed in 50 weeks. You are required to prepare a Work Breakdown Structure (WBS) for discussion with the Local Authority Planning Department in order to coordinate specialist contractor work to stabilize the hillslope.

(b) Sketch the complete Work Breakdown Structures (WBS) of maximum 5 levels and 15 tasks for the whole hillslope Residential Housing Project that clearly includes the specialist contractor works for hillslope stability.

(6 marks)

(c) Sketch the baseline master programme Gantt Chart based on the WBS prepared in **Q5 (b)**.

(5 marks)

(d) Modify, using the same master programme Gantt Chart from **Q5 (c)**, and update it to indicate progress of work as of the 20th week that is on schedule for all activities except installation of two specific tasks, namely the precast wall panels and car garage.

(4 marks)

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– END OF QUESTIONS –

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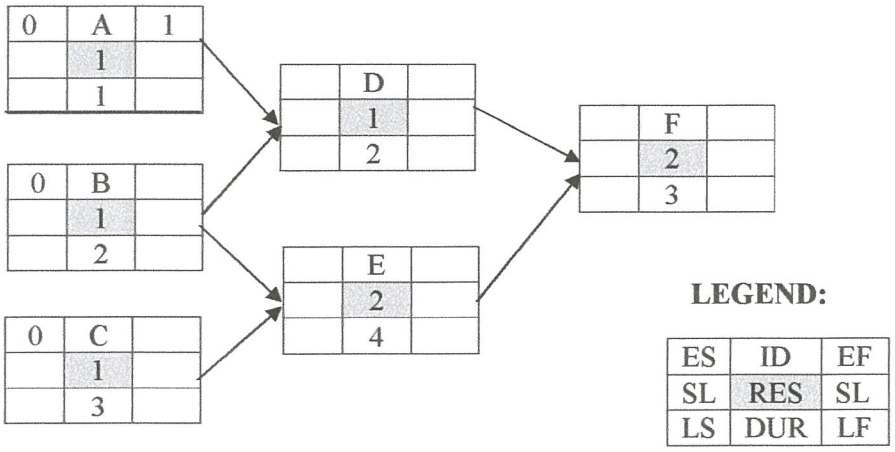

Figure Q4 : Schedule for Project PUTRA ONE

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Table Q4 (a): Original Resource Scheduling

ID	RES	DUR	ES	LF	SLK	0	1	2	3	4	5	6	7	8	9	10	11	12
Resources scheduled																		
Resources available						3	3	3	3	3	3	3	3	3	3	3	3	3

Table Q4 (b): Resource-constrained Scheduling

ID	RES	DUR	ES	LF	SLK	0	1	2	3	4	5	6	7	8	9	10	11	12
Resources scheduled																		
Resources available						2	2	2	2	2	2	2	2	2	2	2	2	2

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