THE HONG KONG POLYTECHNIC UNIVERSITY
HONG KONG COMMUNITY COLLEGE

Subject Title	: Software Engineering	**Subject Code**	: CCN3143
Session	: Semester Two, 2014/15	**Time**	: 14:00 – 17:00
Date	: 2 May 2015	**Time Allowed**	: 3 Hours
Subject Examiner(s)	: Dr Pin NG		

This question paper has a total of **TWELVE** pages (including this covering page).

Instructions to Candidates:

1. There are THREE sections in this paper.
   Section A (30%) – Multiple-choice Questions. Answer ALL questions in this section on the multiple-choice answer sheet provided. Each question carries 1 mark.
   Section B (30%) – Short Questions. Answer any FIVE out of the SIX questions in this section in the answer book provided. Each question carries 6 marks.
   Section C (40%) – Long Questions. Answer any TWO out of the THREE questions in this section in the answer book provided. Each question carries 20 marks.
2. For Section B and Section C, begin each question on a fresh page in the answer book provided.
3. Candidates are NOT allowed to retain the multiple-choice answer sheet, the answer book and the examination question paper.
4. Show all your work clearly and neatly. Marks will be deducted for untidy work.

Authorised Materials:

	YES	NO
CALCULATOR	[ ]	[✓]
SPECIFICALLY PERMITTED ITEMS	[ ]	[✓]

DO NOT TURN OVER THE PAGE UNTIL YOU ARE TOLD TO DO SO

Section B (30%) – Short Questions

Answer any FIVE out of the SIX questions in this section in the answer book provided. Each question carries 6 marks. If more than FIVE questions are answered, only the first FIVE questions answered will be marked.

Question B1

(a) State **THREE** benefits of incremental development, compared to the waterfall model. (3 marks)

(b) Explain the meaning of the following testing activities:

(i) Alpha testing (1 mark)

(ii) Beta testing (1 mark)

(iii) Acceptance testing (1 mark)

Question B2

(a) In the context of software design, explain what architectural pattern is. (2 marks)

(b) Describe the characteristics of the following architectural patterns:

(i) MVC pattern (2 marks)

(ii) Layered architecture pattern (2 marks)

Question B3

(a) What is the purpose of conducting feasibility study at the beginning of a software development project? (2 marks)

(b) Describe **FOUR** major activities involved in re-engineering process. (4 marks)

Question B4

Suggest an appropriate software development process model that can be applied in developing each of the following systems. Give some reasons to justify your suggestions.

(a) An air traffic control system for an international airport. (2 marks)

(b) An online TV channel with online shopping services. (2 marks)

(c) A library system for a government central library with well-defined requirements. (2 marks)

Question B5

(a) What is the meaning of open source development? (2 marks)

(b) In the context of open source development, explain the difference between GNU General Public License (GPL) and Berkley Standard Distribution (BSD) License. (4 marks)

Question B6

(a) Explain why the process of project planning is iterative and why a project plan must be continually reviewed during a software project. (4 marks)

(b) Suppose that you are the project manager of a software development project. If the project is very likely to overrun, explain whether you would add more people to the project team to speed up the development? (2 marks)

- End of Section B -

Section C (40%) – Long Questions

Answer any TWO out of the THREE questions in this section in the answer book provided. Each question carries 20 marks. If more than TWO questions are answered, only the first TWO questions answered will be marked.

Question C1

(a) Explain the difference between functional and non-functional requirements. (4 marks)

(b) In the context of a Web-based fast food ordering system, suggest:

(i) **TWO** examples of functional requirements (2 marks)

(ii) **TWO** examples of non-functional requirements (2 marks)

(c) Explain the usages of **EACH** of the following UML diagrams

(i) Class diagram (2 marks)

(ii) Sequence diagram (2 marks)

(iii) State diagram (2 marks)

(d) With the information given below, identify the possible candidate object classes and model the relationships among the object classes with UML class diagram notations. (Note: you are **NOT** required to specify the attributes and operations of the object classes.)

"There are two categories of members of a travel agent: personal members and corporate members. A member can book many tour packages whereas each tour package is booked by one member only. Each tour package consists of a number of flight tickets and hotel reservations." (6 marks)

Question C2

(a) Explain the difference between white-box testing and black-box testing. (4 marks)

(b) With reference to the following specification, perform the tasks in parts (i) and (ii) of this question.

```
module_A( ) {
    procedure m
        If ( condition x and condition y ) {
            procedure p
            While (condition k) do {
                procedure d
                If (condition e or condition f ) ) {
                    procedure n
                } // end if
                procedure s
            } // end While
        Else
            procedure w
        } // end if
    procedure z
} // end module_A
```

(i) Construct a flow graph. (8 marks)

(ii) Based on the flow graph you created in part (i) of this question, calculate the cyclomatic complexity and trace for all the independent paths. (8 marks)

Question C3

(a) Using the information in Table 1, assuming that all activities will start as early as possible:

ID	Activities	Duration (Weeks)	Preceding activities
A	Requirements analysis	5	--
B	System design	10	A
C	Programming	15	B
D	Telecom setting	5	B
E	Hardware installation	10	B
F	Integration	5	C, D
G	System testing	5	E, F

Table 1

(i) Sketch a Gantt chart for the project. State clearly on the chart the critical path of the project. (10 marks)

(ii) Determine the overall project duration if Activity E requires an additional 10 weeks for completion? (2 marks)

(iii) Determine the overall project duration if Activity C requires an additional 5 weeks for completion? (2 marks)

(b) Briefly describe the **THREE** main types of software maintenance and give an example for each of them. (6 marks)

- End of Section C -

- END OF PAPER -