MALAYSIA INSTITUTE OF INFORMATION TECHNOLOGY

FINAL EXAMINATION
JANUARY 2016 SEMESTER

SUBJECT CODE	:	ITD 31403
SUBJECT TITLE	:	SOFTWARE ENGINEERING
LEVEL	:	DIPLOMA
TIME / DURATION	:	(2 ½ HOURS) 2.00 pm – 4.30 pm
DATE	:	22 MAY 2016

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consists of TWO(2) sections, Section A and B.
4. Answer ALL questions in Section A. For Section B, answer any THREE(3) questions ONLY.
5. Please write your answers on the OMR form and answer booklet provided.
6. Only simple calculator (NOT scientific calculator) is allowed.

SECTION A (Total: 25 marks)

INSTRUCTION: Answer ALL questions.

Please use the OMR form provided.

1. Software cost is usually:
   A. lower than hardware cost
   B. low to produce error free software
   C. higher during maintenance than during development
   D. reflect the quality of software product.

2. Which of the following is **NOT** an essential attributes of a good software?
   A. Maintainability
   B. Efficiency
   C. Acceptability
   D. Agility

3. *"The process of establishing the services that the customer requires from a system and the constraints under which it operates and is developed"* is a definition for……
   A. Requirements analysis
   B. Requirements engineering
   C. Requirements management
   D. Requirements classification

4. The single largest computer-related cost for most organizations:
   A. Software analysis and design
   B. Software implementation
   C. Software testing
   D. Software maintenance

5. Which of the following is **NOT** a metric used to specify the non-functional requirements?
   A. Size
   B. Robustness
   C. Dependability
   D. Ease of use

6. Acceptance tests are normally conducted by the:
   A. developer
   B. end users
   C. test team
   D. systems engineers

7. Which of the following are the readers of the user requirements document?
   i. Client manager
   ii. System end users
   iii. Software developer
   iv. Client engineers
   v System architects

   A. (i), (ii) and (iv)
   B. (i), (ii), (iii) and (iv)
   C. (i), (ii), (iv) and (v)
   D. All of the above.

8. The following are things that make requirements elicitation difficult **EXCEPT**:
   A. scope
   B. understanding
   C. budgeting
   D. volatility

9. Design activities will involve ALL of the following, **EXCEPT**
   A. Architectural design
   B. Interface design
   C. Document design
   D. Database design

10. Which of the following represents the correct order of fundamental software engineering activities?
   i. Software development
   ii. Software evolution
   iii. Software validation
   iv. Software specification

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

11. Which of the following statements about the non-functional requirements are **TRUE**?
   i. Functional requirements are more critical than non-functional requirements
   ii. If functional requirements are not met, the system cannot be used
   iii. Non-functional requirements are more critical than functional requirements
   iv. Non-functional requirements may affect the overall architecture of a system

   A. i and ii
   B. i, ii and iv
   C. iii and iv
   D. All of the above

12. The following are things that make requirements elicitation difficult **EXCEPT**
    A. scope.
    B. understanding.
    C. budgeting.
    D. volatility.

13. What is the distinction between the terms 'shall' and 'should' in a user requirements document?
    A. 'Shall' indicates a mandatory requirement.
    B. 'Shall' indicates a desirable but not essential requirement.
    C. 'Should' indicates a mandatory requirement.
    D. No obvious difference.

14. The best way to conduct a requirements validation review is to
    A. examine the system model for errors.
    B. have the customer look over the requirements.
    C. send them to the design team and see if they have any concerns.
    D. use a checklist of questions to examine each requirement.

15. CASE Tool stands for
    A. Computer Aided Software Engineering.
    B. Component Aided Software Engineering.
    C. Constructive Aided Software Engineering.
    D. Computer Analysis Software Engineering.

16. UML stands for
    A. Uniform Modeling Language.
    B. Unified Modeling Language.
    C. Unit Modeling Language.
    D. Universal Modeling Language.

17. "Are we building the product right?" – is the issue regarding:
    A. Validation
    B. Software Inspections
    C. Verification
    D. Software Testing

18. When should the system testing phase begin?
    A. after beta testing.
    B. before unit testing.
    C. after white box testing.
    D. before user acceptance testing.

19. Acceptance tests are normally conducted by the
    A. developer.
    B. end users.
    C. test team.
    D. systems engineers.

20. The testing technique that requires devising test cases to demonstrate that each program function is operational is called
    A. black-box testing.
    B. glass-box testing.
    C. grey-box testing.
    D. white-box testing.

21. What types of errors are missed out by black-box testing and can be uncovered by white-box testing?
    A. behavioural errors.
    B. logic errors.
    C. typographical errors.
    D. both b and c.

22. Which of the following best described about the regression testing?
    A. Regression testing is testing the system to check that changes have not 'broken' previously working code during the maintenance phase
    B. Regression testing happen only once
    C. Regression testing involve changes to the whole code
    D. Regression testing will make changes to the requirements

23. Algorithmic cost modeling use a formulaic approach to compute the project effort based on estimates of product attributes. Which of the following is **NOT** an algorithmic cost model?
    A. Function oriented
    B. COCOMO 74
    C. Size oriented
    D. COCOMO 81

24. If you are working on a software project in-house, with relatively small team to develop software in a highly familiar environment, and most of the team members have extensive experience in working with related systems within the organization, in which category do you think that the project belongs to?
    A. Organic
    B. Semidetached
    C. Complex
    D. Complex

25. Which statement about a prototype is true?
    A. It is a functional model of the entire system.
    B. It is the complete untested product ready for final review by the customer.
    C. It is necessary in order to accurately verify that the product is progressing in accordance with requirements specifications.
    D. It is a full-scale model of the entire system at some partial stage in development showing the functional form of the system.

SECTION B (Total: 75 marks)

INSTRUCTION: Answer only THREE questions.

Please use the answer booklet provided.

Question 1

Software Project Management is concerned with activities to ensure that software is delivered on time and on schedule and in accordance with the requirements. Major activities are including Project Planning, People Management and Risk Management.

Project managers assess the risks that may affect a project, monitor these risks and take action when problems arise. Risk management is concerned with identifying risks and drawing up plans to minimise their effect on a project.

(a) Compare and contrast **THREE (3)** categories of risks. (6 marks)

(b) Describe and give common examples **THREE (3)** categories of risks given in (a). (11 marks)

(c) Draw a diagram of **FOUR (4)** stages of risk management process. (8 marks)

Question 2

A program is to determine medical insurance premiums for a group of employees, based upon the age and gender (male or female) of the client. For a female of age >= 18 and <= 30 the premium is RM100. A female age >= 31 pays RM200. A male of age >= 18 and <= 35 pays RM300. A male age >= 36 pays RM450. If people age 50 or more pay half premium. Any other ages or genders are an error, which is signaled as a premium of zero. Identify **how many paths** through the program and devise **white box** test data for the following C++ code segment:

(25 marks)

Test Number	Data 1	Data 2	Outcome
1	Female	17	0.0
.	.	.	.
.	.	.	.
.	.	.	.

```
float calcPremium (float age, string gender)
{
      float premium;
      if (gender == "female")
      {
            if ((age >= 18) && (age <= 30))
                  premium = 100.00;
            else if (age >= 31)
                  premium = 200.00;
            else
                  premium = 0.0;
      }
else if (gender == "male")
      {
            if ((age >= 18) && (age <= 35))
                  premium = 300.00;
            else if (age >= 36)
                  premium = 450.00;
            else
                  premium = 0.0;
      }
else
      premium = 0.0;
if (age >= 50)
      premium = premium * 0.5;
return premium;}
```

Question 3

The black box approach to testing is to devise sample data that is representative of all possible data, with neither information available about the program code nor the internal structure of the program. Two most popular techniques are Equivalence Partitioning and Boundary Value Analysis. (25 marks)

(a) Compare and contrast the rules for test data using Equivalence Partitioning and Boundary Value Analysis. (6 marks)

(b) Consider a scenario of booking cruise tickets. Passengers are allowed to book a minimum of 1 ticket and a maximum of 50 tickets. Follow the rules for Equivalence Partitioning, do partition(by labelling the partition) the input data values and select representative data from each partition to fill the table below. Use rules for Boundary Value Analysis to select data at the boundaries of partitions. (13 marks)

Equivalence Partitioning

Partition ____	Partition____	Partition ____

(c) Discuss about three(3) types of user testing. (6 marks)

Question 4

(a) The information about Project A is given in Table 1.0 and Table 1.1, assume that the weighting factor is average, solve the following questions accurately.

Table 1.0

No.	Function-Oriented Metrics	
1	Number of user inputs	7
2	Number of user outputs	7
3	Number of user inquiries	11
4	Number of files	5
5	Number of external interfaces	5

- With the following complexity adjustment value :

Table 1.1

No.	Factor	Value
1	Backup and recovery	0
2	Data communications	0
3	Distributed processing	0
4	Performance critical	3
5	Existing operating environment	0
6	Online data entry	4
7	Input transaction over multiple screens	2
8	Master files updated online	0
9	Information domain values complex	2
10	Internal processing complex	2
11	Code designed for reuse	2
12	Conversion / installation in design	0
13	Multiple installation	0
14	Application designed for change	2

(i) By referring to the above Table 1.0 and 1.1, calculate the raw function point. Show the step-by-step process. (4 marks)

(ii) Based on your answer in a (i), determine the function point. (5 marks)

(b) You are given the following :

Table 2.0 : Complexity Level for Each Object

Developer's Experience & Capability	VL	L	N	H	VH
Productivity Object-Point per Person-Month	4	7	13	25	50

Table 2.1 : The Object-Counts

Object Type	Simple	Medium	Difficult
Screen	2	3	1
Report		2	1
3GL Components			2

In addition, assume that :

- Reuse 30% of the components from previous projects.
- The productivity is high.
- Programming language is C++.

Based on the above details and tables, answer the following questions. You may also refer to Appendix A. (HINT : Calculation should be made in detail).

(i) Calculate the number of object point. (4 marks)

(ii) Compute the estimated effort of person-months needed to develop the system. (7 marks)

(iii) Calculate the estimated number of kLOC. (5 marks)

END OF QUESTION

APPENDIX A

Function Point Metrics

Parameter Count	Simple	Average	Complex
Inputs	3	4	6
Outputs	4	5	7
Inquiries	3	4	6
Files	7	10	15
Interfaces	5	7	10

Complexity Weight for Object Point

Object Type	Complexity weight		
	Simple	Medium	Difficult
Screen	1	2	3
Report	2	5	8
3GL Component			10

LOC estimation

Programming Language	LOC/ FP (Average)
C++	64
PHP	67
Java	53