UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2023/2024

COURSE NAME : SOFTWARE ENGINEERING

COURSE CODE : BIT 10103

PROGRAMME CODE : BIT

EXAMINATION DATE : JULY 2024

DURATION : 3 HOURS

INSTRUCTIONS :
1. ANSWER ALL QUESTIONS
2. THIS FINAL EXAMINATION IS CONDUCTED VIA
   ☐ Open book
   ☒ Closed book
3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

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PART A

Q1   Which of the following statements accurately describe the dual function of requirements?
(a)   Requirements can range from abstract statements to detailed specifications and may serve as the basis for a contract bid or the contract itself.

(b)   Requirements are strictly defined in detail and are only used for bidding on contracts.

(c)   Requirements are open to interpretation and are primarily used for bidding on contracts rather than defining the contract itself.

(d)   Requirements are solely detailed mathematical functional specifications and do not serve any other function in contract negotiations.

(2 marks)

Q2   Which of the following statements **BEST** distinguishes between user requirements and system requirements?
(a)   User requirements are detailed descriptions of system functions, while system requirements are written for customers.

(b)   User requirements include natural language statements and diagrams for customers, while system requirements provide detailed descriptions of system functions and constraints for implementation.

(c)   User requirements are part of the contract between the client and contractor, while system requirements outline operational constraints.

(d)   User requirements are structured documents defining system functions, while system requirements provide diagrams of services the system provides.

(2 marks)

Q3   These are the quality characteristic of design process **EXCEPT** _____.

(a)   the design must implement all of the explicit requirements

(b)   the design must be a readable and understandable guide

(c)   the design should provide a complete picture of the software

(d)   the design must write requirements clear without ambiguous statements

(2 marks)

Q4   Which pair is **TRUE** for design model element with process dimension?

(a)   Data flow diagram for architecture elements

(b)   Graphical user interface for interface elements

(c)   Data structures for data elements

(d)   Activity diagram for components elements

(2 marks)

Q5   **Figure Q5.1** shows the Generic Layered Architecture. Select the layer name for A and B.
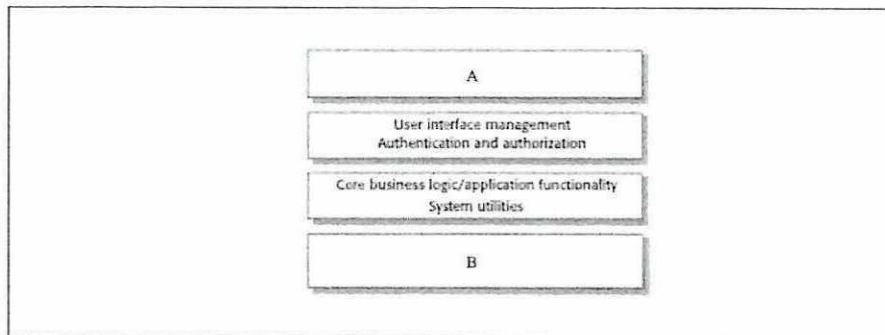
Figure Q5.1

(a)   A: System Support, B: User Interface

(b)   A: Software Support, B: System Interface

(c)   A: User Interface, B: Software Support

(d)   A: User Interface, B: System Support

(2 marks)

Q6   Acceptance tests are normally conducted by the _____.

(a)   developer

(b)   end users

(c)   test team

(d)   systems engineers

(2 marks)

Q7   What is the normal order of activities in which traditional software testing is organized?

        (i)   integration testing

        (ii)   system testing

        (iii)   unit testing

        (iv)   validation testing

(a)   i, iv, iii, ii

(b)   ii, iv, i, iii

(c)   iii, i, iv, ii

(d)   iv, ii, iii, i

(2 marks)

Q8   Which test refers to the retesting of a unit, integration and system after modification, in order to ascertain that the change has not introduced new faults?

(a)   Regression Test

(b)   Smoke Test

(c)   Alpha Test

(d)   Beta Test

(2 marks)

Q9   If the effort is 25 person-month, which of the following is **TRUE** regarding the duration of time based on embedded of project development.

(a)   4

(b)   5

(c)   6

(d)   7

(2 marks)

Q10   If the effort is 31 person-month and duration of project time completed is 9 months, which of the following is **TRUE** regarding the number of people required for the project.

(a)   3

(b)   4

(c)   5

(d)   6

(2 marks)

PART B

Q11   Answer **Q11(a)** and **Q11(b)** based on the scenario in **Figure Q11.1**.

```
1   A small online retail business specialising in handmade jewellery aims to
2   streamline its operations and enhance customer satisfaction through the
3   development of an efficient inventory system. The system must track inventory
4   levels, update stock in real time, and ensure inventory accuracy. The
5   inventory matches the physical inventory on hand. It will generate reports
6   on sales and stock status, integrating seamlessly with the online store to
7   provide customers with a smooth shopping experience and timely order
8   fulfilment. Security is paramount, with the system offering secure access
9   for employees and prioritising data protection for sensitive customer and
10  inventory information. The system's architecture must be robust and scalable,
11  capable of handling high transaction volumes with minimal latency. It ensures
12  minimal delay in updating inventory and processing transactions to provide
13  a smooth and responsive user experience. Additionally, the user interface
14  should be intuitive, reducing training time for employees, minimising errors
15  in inventory management tasks, and ultimately optimising productivity.
```

Figure Q11.1

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(a)   Write **FIVE (5)** functional requirements. Show the line number(s) for each answer.

(10 marks)

(b)   Write **FIVE (5)** non-functional requirements. Show the line number(s) for each answer.

(10 marks)

Q12 (a)   Write a Design Principles that match the following scenarios.

(i)   In software development, design and coding are distinct but essential parts of the process, each contributing to the final product in its own way.

(2 marks)

(ii)   If users want an easy checkout process, the design focuses on making that happen. This way, they ensure the design stays true to what they found out in the beginning, making a website that really meets users' needs.

(2 marks)

(iii)   Each sub problem is solved by sub solution. When a change required, designer can focus on each sub problem to change the sub solution modularly.

(2 marks)

(b)   Discuss **THREE (3)** advantages of Explicit Architecture.

(9 marks)

(c)   Discuss 4 + 1 View Model of Software Architecture.

(10 marks)

Q13   Determine test conditions required for the following scenarios using equivalence partitioning technique:

(a)   Only 18-years-old born between January 1 and August 31, 2004 are automatically registered and eligible to vote in the 15th General Election.

(5 marks)

(b)   Degree and Diploma classes awarded are dependent on achievement final Cumulative Grade Point Average (CGPA) as follows;

     CGPA $\geq$ 3.70: First class honor
     3.00 $\leq$ CGPA < 3.70: Second class (upper)
     2.30 $\leq$ CGPA < 3.00: Second class (lower)
     2.00 $\leq$ CGPA < 2.30: Third class

(5 marks)

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(c) Universiti Tun Hussein Onn Malaysia (UTHM) has over 50 student clubs registered with the Pusat Sukan UTHM (PSU). PSU is the party that is responsible for approving or rejecting each application. UTHM Students' Event Management System (USEM) is a web-based system which has been developed to systematize an event application and facilitate event management. Clubs may apply the event budget through the PSU. Every club has the right to apply a budget lower than RM1000.

(5 marks)

(d) Password field which accepts minimum of 6 characters and maximum of 12 characters.

(5 marks)

Q14 Calculate the the estimated effort required to develop a simple software system with 5000 lines of code using Basic COCOMO and Intermediate COCOMO based on constant tuning coefficient and exponent where the team has very high analyst capability and low required development schedule. Given the the cost drivers in **Table Q14.1**.

Table Q14.1 Cost drivers

Cost Drivers	Ratings					
	Very Low	Low	Nominal	High	Very High	Extra High
Product attributes						
Required software reliability	0.75	0.88	1.00	1.15	1.40	
Size of application database		0.94	1.00	1.08	1.16	
Complexity of the product	0.70	0.85	1.00	1.15	1.30	1.65
Hardware attributes						
Run-time performance constraints			1.00	1.11	1.30	1.66
Memory constraints			1.00	1.06	1.21	1.56
Volatility of the virtual machine environment		0.87	1.00	1.15	1.30	
Required turnabout time		0.87	1.00	1.07	1.15	
Personnel attributes						
Analyst capability	1.46	1.19	1.00	0.86	0.71	
Applications experience	1.29	1.13	1.00	0.91	0.82	
Software engineer capability	1.42	1.17	1.00	0.86	0.70	
Virtual machine experience	1.21	1.10	1.00	0.90		
Programming language experience	1.14	1.07	1.00	0.95		
Project attributes						
Application of software engineering methods	1.24	1.10	1.00	0.91	0.82	
Use of software tools	1.24	1.10	1.00	0.91	0.83	
Required development schedule	1.23	1.08	1.00	1.04	1.10	

(15 marks)

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- END OF QUESTIONS -

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