Student ID: _____

PRACTICE EXAMINATION

SWEN90016 Software Processes and Management

Exam Duration: 2 hours

Total marks for this paper: 50

Reading Time: 15 minutes

Open book status: Closed book

This paper has 14 pages.

Authorised materials:
Students may bring a non-programmable calculator into the room.

Instructions to Invigilators:
Each student should initially receive an exam paper with 14 pages.
Students may NOT keep the exam paper after the examination.

Instructions to Students:

- Attempt *all* questions.

- Answer multiple-choice questions by circling a single correct answer.

- Answer all other questions only in the boxes on the exam paper. The blank pages can be used for rough working.

- Answer questions only on this exam paper.

The exam consists of 16 questions, totalling 50 marks. The number of marks for each question is shown at the start of the question and gives an indication for how much time/effort should be spent on the question (roughly two minutes per mark). Remember that rationale and justification is important in answering questions BUT also be as concise as possible with your answers. Point form is acceptable for more descriptive answers.

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Part A – Multiple-Choice Questions [10 marks]

Question 1 [1 Mark(s)]

Which of the following is not a characteristic of an Agile SDLC model?

1. Focuses on adapting to changing situations
2. Depends on constant and regular feedback
3. Scope well-defined at inception ✓
4. Customer focus over formalised sign-offs
5. Small manageable actions and activities

Question 2 [1 Mark(s)]

Consider the following activities related to an IT project.
A. Analyse project constraints - scope, time, cost
B. Analyse the business case
C. Develop a product backlog
D. Develop a Project Charter ✓
E. Develop a Project Management Plan (PMP)

Which of the above activities are typically performed during the project initialization phase?

1. A, C and D only
2. A, B and E only
3. C and D only
4. C and E only
5. A, B, and D only ✓

Question 3 [1 Mark(s)]

Which of the following does NOT belong in a Project Charter?

1. Project team
2. Project schedule ✓
3. Project milestones
4. Target delivery date
5. Project description

Question 4 [1 Mark(s)]

Consider the following characteristics in relation to a SDLC.

A. Partitioning a project into increments needs well-defined requirements
B. The final project must integrate all the increments
C. Client can easily test product chunk at defined stages of the project
D. Compatible with Work Breakdown Structure (WBS) technique

Which of the above characteristics apply to the Incremental SDLC?

1. A only
2. A and B only
3. A, B, and C only
4. A, B and D only
5. All of the above

Question 5 [1 Mark(s)]

Where are the customer requirements documented in a Scrum project?

1. In the Product Backlog.
2. In the Sprint Backlog.
3. In the Release Backlog.
4. In a Scrum Product Requirement Specification.
5. The Scrum Master Backlog.

Question 6 [1 Mark(s)]

When does Scrum PMP recommend grooming the Product Backlog?

1. Once, during the initial PMP Speculate Stage
2. Often, during every iteration of the PMP Speculate Stage
3. Often, during every iteration of the PMP Adapt Stage
4. Whenever requirements are added, changed and re-prioritised
5. At the start and end of each Speculate Stage

Question 7 [1 Mark(s)]

Which of the following is NOT a Scrum Product Owner's responsibility?

1. Decide on release date and contents
2. Prioritise features according to market value

3. Define the features of the product

4. Accept or reject work results

5. Enacting Scrum values and practices

Question 8 [1 Mark(s)]

In which Scrum ceremony is the Sprint Backlog created?

1. Sprint Planning

2. Sprint Initializing

3. Sprint Review

4. Daily Stand-ups

5. Sprint Retrospective

Question 9 [1 Mark(s)]

Consider the following characteristics related to an IT Project
A. Stability of the requirements
B. Availability of end users for collaboration
C. Characteristics of the delivery time line
D. Project teams and their location

Which of the above characteristics should be taken into consideration when choosing between a formal and agile SDLC?

1. A and B only

2. A and C only

3. A, B and D only

4. A, B and C only

5. A, B, C and D

Question 10 [1 Mark(s)]

Which of the following related to software cost estimation is incorrect?

1. Algorithmic cost estimation is based on a model developed using historical data

2. Function Points for a software system depends on the programming language used

3. Function Points measure the size of the solution instead of the size of the problem

4. Lines of code (LOC) is a popular metric for measuring software size because it is an intuitive measure

5. Function Points can be estimated early in analysis and design

Part B – Short-Answer Questions [16 marks]

Question 11 [4 Mark(s)]

What type of leadership style is suitable for a Scrum project? Justify your answer.

Servant leadership. In a Scrum team , the power and control are shared within the team and every team member is involved in decision making. It is better to manage teams by removing impediments that get in their way and by coaching them in best practices.

Question 12 [3 Mark(s)]

What is the purpose of the Scrum Sprint Review, who is invited and when is it held during the Scrum life cycle?

The purpose of the Scrum Sprint Review is to let the team present what it accomplished during the sprint. The whole team participates and invite the world. It is held at the end of each sprint.
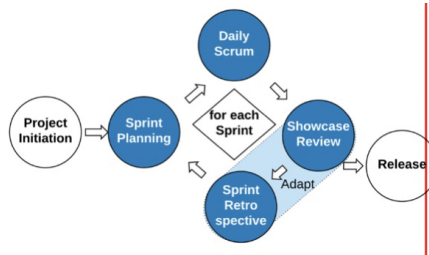
Question 13 [5 Mark(s)]

Given a software project has a budget, the following questions ask you to show how you would monitor and control costs.

Bob estimates 36 hours to complete a task and his hourly rate is $125.

The planned value for this task is $4500.

(i) [**0.5 mark**] After Bob has completed 12 hours of work, what is the actual cost?

(ii) [**0.5 mark**] However, Bob has only completed 20% of the task after 12 hours of work. What is the earned value?

(iii) [**2 marks**] Is the task on budget? What is the actual cost of the task if Bob continues the current work rate?

(iv) [**2 marks**] Is the task on schedule? How many hours do you estimate this task will take if Bob continues the current work rate? How would the schedule vary from the planned schedule?

i. $AC = 12 \cdot 125 = 1500 \, (\$)$

ii. $EC = 0.2 \cdot 4500 = 900 \, (\$)$

iii. No, $1500 \div 0.2 = 7500 \, (\$)$

iv. No, $12 \div 0.2 = 60 \, (hours)$

It varies by 24 hours extra

Question 14 [4 Mark(s)]

List two advantages and two disadvantages of using a Quality Assurance Process in a software project.

Advantages of standards

– Provide a framework around which the quality assurance process may be implemented

– Provide encapsulation of best, or at least most appropriate, practice

– Customers sometimes require a particular quality standard/level when choosing a software vendor

Problems with standards

– Not seen as relevant and up-to-date by software engineers

– Involve too much bureaucratic form filling

– Unsupported by software tools so tedious manual work is involved to maintain standards

Standards should not be avoided, but should be tailored as needed!

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Part C – Extended-Answer Questions [24 marks]

Question 15   **[8 Mark(s)]**

Project_A is a Scrum project which has a Product Backlog consisting of the User Stories and estimated Story Points given in the table below.

Sprint Backlog	
User Story	**Story Points**
Story_1	3
Story_2	5
Story_3	13
Story_4	8
Story_5	1
Story_6	3
Story_7	2

An established development team has an *average velocity* of *seven* (**7**) User Story Points per fortnight.

(i) **[2 marks]** Describe how one would compute the *average velocity* of an agile team.

(ii) **[2 marks]** Estimate how many weeks this team will take to deliver Project_A.

(iii) **[2 marks]** If the team actually takes two weeks to complete the first two User Stories, what is the actual velocity of the team?

(iv) **[2 marks]** If a new 4 Story Point User Story is added at the start of week 3, then in how many weeks do you estimate this Sprint will take to be delivered now?

2i) Use "Just in Time" estimate. The team accesses total SP
and make an estimate of what can be cover.

(ii) $3 + 5 + 13 + 8 + 1 + 3 + 2 = 35$ (SP)

$35 \div 7 \times 2 = 10$ (weeks)

∴ They may need 10 weeks to deliver

(iii) $(3+5)/1 = 8$ (SP/fortnight)

∴ The actual velocity is 8 SP/fortnight

(iv) $4 + 13 + 8 + 1 + 3 + 2 = 31$ (SP)

$\lceil 31/8 \rceil = 4$ (fortnights) = 8 (weeks)

$8 + 2 = 10$ weeks

Question 16 [16 Mark(s)]

The following questions refer to the Temporal Bone Surgery Virtual Reality Simulator system that was explored in Tutorial 1. The product is to be developed by a student team in a year-long project subject.

Recall the following key features of the system.

(a) A feature that loads 3D temporal bone images.

(b) An algorithm that builds a model and renders the model for viewing.

(c) A feature that interacts with the model to simulate a virtual operation. The interaction to drill the virtual bone is simulated by a pressure sensitive drill-like device which gives the user the perception of touching real bone. The device updates the 3D model.

(d) A feature that enables the virtual operation to be replayed.

(e) A feature that enables the state of the virtual operation to be saved and reloaded.

Your Team   Your team consists of the following members:

Steward Edward	A hardworking information seeker that is experienced in architecture and in detailed design. He has good programming skills but is a dominating personality.
Audrey Count	A follower and information giver who is an above average programmer and tester. She is practical, reliable and efficient.
Emily Gardner	A Shaper who is an expert in requirements engineering, quality assurance and testing.
Michael Mac	A free rider who tends to be unproductive and disruptive. He can write average quality code when given supervision and encouragement.

Answer the following questions about the Temporal Bone Surgery Virtual Reality Simulator. In cases where the project description is not specific you can make reasonable assumptions and state your assumptions.

(i) [**3 marks**] Identify three major risks for the project, and state what impact each risk will have on the project or the product.

(ii) **[5 marks]** Choose a SDLC for the project and justify your choice.

(iii) [**4 marks**] Design and justify a suitable team structure that is appropriate for your team and your choice of SDLC. Identify which role each team member will take.

(iv) [**4 marks**] Does your chosen SDLC and the team structure help mitigate all or some of the identified risks? Explain.

— End of exam —