

**ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)**  
**ORGANISATION OF ISLAMIC COOPERATION (OIC)**

**Department of Computer Science and Engineering (CSE)**

**SEMESTER FINAL EXAMINATION**

**SUMMER SEMESTER, 2021-2022**

**DURATION: 3 HOURS**

**FULL MARKS: 150**

**SWE 4803: Software Project Management**

**Programmable calculators are not allowed. Do not write anything on the question paper.**

Answer **all 6 (six)** questions. Figures in the right margin indicate full marks of questions whereas corresponding CO and PO are written within parentheses.

1. a) To finish the 360-degree image viewer development for your ongoing software project, you need to incorporate an image stitching library. Due to your company's lack of expertise in image stitching, you have decided to outsource the library and have gathered data on four different libraries from four different companies. 12
- Assess and select the most suitable image stitching library from four available options with proper justification by considering the criteria provided in Table 1. Based on the given criteria, you need to consider that the *Resolution Limit* holds the highest weightage of 40%, while all other criteria are considered equally important. Furthermore, price is the only non-beneficial factor.

**Table 1:** Data for Question 1a).

	Criteria			
	Price	Library Size	Resolution Limit	Performance
Image Stitching Lib 1	\$2500	16 MB	12 MP	Excellent (5)
Image Stitching Lib 2	\$2000	16 MB	8 MP	Average (3)
Image Stitching Lib 3	\$3000	32 MB	16 MP	Good (4)
Image Stitching Lib 4	\$2750	32 MB	8 MP	Good (4)

- b) "Lag provides mandatory delay to the Successor Activity and Lead provides acceleration to the Successor Activity" – justify the statement with a proper example. 8
- c) What are the factors to be considered in resource acquisition? 5
2. a) What is the least accurate cost estimation technique? When should a project manager use this kind of cost estimation technique? 5
- b) You are a project manager and have just passed the Project Management Professional (PMP) exam. Due to your extensive experience and your newly awarded certification, you have been asked to lead your company's new Project Management Office. The team members assigned to this office do not have as much project management experience as you do, and none of them have received their PMP certification. As a result, they follow your lead on decisions regarding the project management processes you want to put into place. What type of power of a project manager is this? Mention other types of power of a project manager with appropriate examples. 10



- c) A software development company has recently implemented a new quality control process to ensure that all codes are thoroughly tested before being released to clients. The company estimates that the cost of implementing this process is \$50,000 per year. After implementing the new quality assurance process, the company finds that there are still defects in the software product that need to be fixed. The company estimates that it will cost \$5,000 to fix each defect and that there are 50 defects that need to be fixed. What is the cost of conformance and nonconformance in this scenario, and what actions can the company take to reduce the cost of nonconformance?
3. a) As a project manager, you need to decide whether to invest \$120M to build a new data center or to invest only \$50M to upgrade the existing data center. If you decide to build a new one, then there is a 60% chance that the new data center will help to generate revenue of \$200M and 40% chance of generating revenue of \$90M. However, if you decide to upgrade the existing data center then there is a 60% chance that it will help to generate revenue of \$120M and 40% chance of generating revenue of \$60M. Using proper data analysis method, perform the quantitative risk analysis to determine the riskiest option for investment.
- b) A company is developing a new software application and there are several potential risks that could impact the project's success. The project team has identified the following risks:
- One of the key developers of the project may leave the company in the middle of the project, causing a delay in the project timeline and affecting the overall quality of the software.
  - The software application may be vulnerable to cyber-attacks and security breaches.
  - The project may experience budget overruns due to unforeseen circumstances.
  - The final software product may not meet the needs or expectations of end-users.
  - The project team may experience communication breakdowns and conflicts that could impact project delivery.
- With proper justification, identify the strategies to deal with the risks mentioned above.
- c) Assume that the target cost is \$2,000,000, the target price is \$2,200,000, the ceiling price is \$2,450,000, and the sharing ratio is 80:20 for cost overruns. Beyond which cost level will the seller start to assume total responsibility of contract costs?
4. a) In a project meeting, you were demonstrating the shared web space for your team to collaborate. You and team members provide updates on this shared space for others to download those updates as and when required. One of your team members, Harry, was not present at the meeting. You left a message on his voicemail system. When Harry came back, he called you and discussed the matter with you. With proper justification, identify all the communication methods used in this scenario.
- b) You are a project manager for a large IT organization. You have worked with your current project team for a long time and have established a good working relationship with them. The team has worked on several major projects under your leadership and has always done an outstanding job. What stage of team development is this team in? What are the other stages of team development?



Does profit/fee become zero at PTA? Justify your answer with proper example.

8  
(CO3)  
(PO11)

d) In a meeting, a problem was discussed by a team, but one member named Saarah approached you later and said that the problem was not really solved. She thinks her concerns were still valid and need to be addressed. Determine the conflict resolution technique being used here.

5  
(CO3)  
(PO2)

5. a) Explain the purpose of procession tailoring.

5

b) What are the unique characteristics of a project, program, and portfolio, and how do they differ from one another?

6

c) Identify and explain the important characteristics of software development projects which make them harder to manage compared to other types of projects.

6

d) Dependency determination is used as a tool to sequence the project activities. Mention different kind of dependencies with proper example.

8

6. a) What are the limitations of using a burndown chart in Agile project management?

5

b) A company is managing a software development project for 12 months with a budget of \$100000. As of today, it is observed that 60% of the budget has been used while only 40% of the work has been completed. According to the project schedule 50% of the work should be done by this time.

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Based on the given information calculate the schedule and cost performance index. If the current cost and schedule performance continue, what will be the new *Estimate At Completion (EAC)* and what is the *To Complete Performance Index (TCPI)* that would be required to complete the project within the original budget?

c) Assume that a software development team has three QA members working on a project, and the project manager wants to monitor the number of bugs reported each day over a 15-days period to ensure that they are meeting the project's quality standards. Table 2 shows the last 15 days bug reporting status.

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**Table 2:** Data for Question 6.c).

	Day														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
QA1	4	4	3	3	2	5	5	4	5	5	1	1	10	8	1
QA2	4	4	3	3	2	3	5	5	5	5	1	1	4	8	1
QA3	4	2	3	2	3	3	4	4	6	5	3	1	3	4	2

Based on the provided data, construct a statistical process control chart and identify the out-of-control signals.