B5.1-R4: SOFTWARE PROJECT MANAGEMENT

NOTE:

1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1.

a) What is a Project? What are the specification and parameters required to define a project?

b) As a project manager would it be worthwhile on your part to reduce the project duration by half provided the customer agrees to pay for the increased manpower requirements?

c) Identify a suitable life cycle model for developing a software product using the object-oriented paradigm. Justify your answer.

d) In which units can you measure the productivity of a software development team? List three important factors that affect the productivity of a software development team.

e) What is the objective of the Project Planning Process? List various activities a software project manager performs in planning.

f) List two common types of risks that a typical software project might suffer from. Give at least one example of each type of risk.

g) Briefly explain the differences among budget, cost, and price of a software project.

(7x4)

2.

a) Suppose that as the project manager you estimate the effort required to develop a software product to be 50 person-months. Can you develop this product by employing 50 persons for 1 month? By employing 1 person for 50 months? Justify your answer in each case.

b) What do you understand by a "critical path" in a project schedule? Can there be more than one critical path in a project schedule? Why is it important for the project manager to identify the critical paths in a project schedule?

c) Assume that the likelihood of one of the valuable team members leaving the project mid-way is 0.5. If the member actually leaves, then the probability of project getting delayed unreasonably is 0.5. If the project gets delayed unreasonably, then the displeasure of the customer is equivalent to Rs. 10,00,000 in monetary terms. To counter this risk, you can recruit a fresh engineer at a salary of Rs. 50,000/- for six months. If the important engineer does not leave, then the contribution of this engineer would be 0.2 of his total salary for six months in monetary terms. After recruiting the fresh engineer, the probability of the project getting delayed if the important engineer leaves is 10%. Would it be a good idea to employ the fresh engineer?

(6+6+6)

3.

a) Define two metrics for measuring software size. Compare the relative advantages of these two metrics for use in project management.

b) Explain the reasons why adding more manpower to a late project makes it worse.

c) Briefly explain what you understand by software project management lifecycle?

(6+6+6)

4.

a) Compare the advantages and disadvantages of the following two project size estimation techniques: expert judgment and Delphi technique.

b) What do you mean by process modelling? Why is it required? How can a process be modelled?

c) What do you mean by project auditing? Why is it required? Who carries out project auditing?

(6+6+6)

5.

a) Name the different ways in which software development teams are organized. For the development of a challenging satellite-based mobile communication product which type of project team organization would you recommend? Justify your answer.

b) What do you understand by software configuration? What is meant by software configuration management? How can you manage software configuration (only mention the names of the principal activities involved)?

c) Explain how you can choose the best risk reduction technique when there are many ways of reducing a risk.

(6+6+6)

6.

a) When does the project planning activity start and end in a software life cycle? Explain the important activities that software project managers perform during project planning.

b) What is the difference between product and process metrics? Give two examples of each.

c) Explain how Putnam's model can be used to compute the change in project cost with project duration. What are the main disadvantages of using the Putnam's model to compute the additional costs incurred due to schedule compression?

(6+6+6)

7.

a) Suppose you are developing a software product in the organic mode. You have estimated the size of the product to be about 100,000 lines of code. Compute the nominal effort and the development time. You can make use of the following formula supplied to you:

Organic:	Effort=2.4*(KLOC)$^{1.05}$ PM	Development time= 2.5(Effort)$^{0.38}$ months
Semidetached:	Effort=3.0*(KLOC)$^{1.12}$ PM	Development time= 2.5(Effort)$^{0.35}$ months
Embedded:	Effort=3.6*(KLOC)$^{1.20}$ PM	Development time= 2.5(Effort)$^{0.32}$ months

where, KLOC means Kilo Lines of source Code, and PM is effort in person-month units.

b) Why is it necessary for a project manager to decompose the tasks of a project using Work Breakdown Structure (WBS)? To what granularity level are the tasks decomposed? Explain your answer.

c) What do you understand by Pareto analysis? How is it useful in project management?

(6+6+6)