BE6-R3: 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 do you understand by the term "product visibility" in the context of software development? How does improved product visibility help in effective software project management?

b) As a project manager would it be worthwhile on your part to reduce the estimated duration of your project from two years to one year? What would be the impact of accepting such a customer request?

c) List the aspects of a project that need to be planned by a project manager during the project planning stage.

d) As the manager of a software project to develop a product for business application, if you estimate the effort required for completion of the project to be 50 person-months, can you complete the project by employing 50 developers for a period of one month? Justify your answer.

e) What do you understand by pareto analysis? How is it useful in project management?

f) What do you understand by the principles of abstraction and decomposition? Why are these two principles considered important in software engineering?

g) What do you understand by project risk? How can risks be effectively identified by a project manager?

(7x4)

2.

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

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

c) List three common risks that a typical software project might suffer from. Suppose you are the project manager of a large software development project, point out the main steps you would follow to manage risks in your software project.

(6+6+6)

3.

a) What is a software process? What is the relationship between a product and a process?

b) What is a model? Why modelling is considered to be an important software engineering activity? Name a few types of models constructed during an object-oriented software development process.

c) What is the difference between process and project metrics? Give one example of each. How are these two types of metrics useful in software project management?

(6+6+6)

4.

a) 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?

b) What are the different project parameters that determine the cost of a project? What are the important factors which make it hard to accurately estimate the cost of software projects? If you are a project manager bidding for a product development to a customer, would you qoute the cost estimated using COCOMO as the price in your bid? Explain your answer.

c) Suppose you are appointed as the project manager of a project to develop a commercial word processing software product providing features comparable to MS-WORD software, develop the work breakdown structure (WBS). Explain your answer.

(6+6+6)

5.

a) Explain how a project manager can effectively control a project?

b) Explain the special considerations needed by a project manager while managing an object-oriented development project compared to a traditional project.

c) 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. Using the following, find the nominal effort and the development time. You need not simplify the expressions involved.

Organic: $\text{Effort}=2.4*(\text{KLOC})^{1.05}$ PM   Development time$= 2.5(\text{Effort})^{0.38}$ months

Semidetached: $\text{Effort}=3.0*(\text{KLOC})^{1.12}$ PM   Development time$= 2.5(\text{Effort})^{0.35}$ months

Embedded: $\text{Effort}=3.6*(\text{KLOC})^{1.20}$ PM   Development time$= 2.5(\text{Effort})^{0.32}$ months

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

(6+6+6)

6.

a) You have estimated the nominal development time of a moderate-sized software product to be 10 months. You have also estimated that it will cost Rs.500,000/- to develop the software product. Now, the customer comes and tells you that he wants you to accelerate the delivery time by 10%. How much additional cost would you charge the customer for this accelerated delivery?

b) What do you understand by project audit? When is it undertaken? What are the main steps in conducting an audit? What are its advantages?

c) What do you understand by a quality software product? How a software project manager facilitate development of a quality software product?

(6+6+6)

7.

a) Suppose you are the project manager of a certain software development project. Explain how you would carry out the *risk analysis*? What would be the outcome of the risk analysis? How would the outcome of your risk analysis be used to manage the risks?

b) Briefly explain the main differences between the original COCOMO estimation model and the COCOMO 2 estimation model.

c) Suppose you are the project manager of a software project requiring the following activities.

Activity No.	Activity Name	Duration (weeks)	Immediate Predecessor
1	Obtain requirements	4	None
2	Analyze operations	4	1
3	Define subsystems	2	1
4	Develop database design	4	1
5	Make decision analysis	3	2
6	Identify constraints	8	5
7	Build module 1	12	3,4,6
8	Build module 2	18	3,4,6
9	Build module 3	10	3,4,6
10	Write report	10	6
11	Integration and test	8	7,8,9
12	Implementation	2	10.11

i) Draw the network representation of the project.

ii) Assume that you have only 3 engineers available at your disposal through out the project for carrying out the different activities. Perform resource planning and represent your results in the form of a PERT chart.

(5+5+8)