

N.B. (1) Question No. 1 is compulsory.

(2) Answer any four questions from the rest.

M, E, C, M, m, l, c, Design, Sem, & PDC, *Computer Modelling & Software Eng, 3Hrs*

1. (a) Explain how the algorithmic approach to cost estimation may be used by project managers for option analysis. Suggest a situation where managers may choose an approach that is not based on the lowest project cost. 10
- (b) (i) Describe the essential characteristics of software tools that support test automation. 5
- (ii) Distinguish between validation testing and defect testing. 5
2. (a) Explain why interface testing is necessary even when individual components have been extensively validated through component testing and program inspections. 10
- (b) (i) Discuss the difference between black box and structural testing and suggest how they can be used together in the defect testing process. 5
- (ii) Explain why bottom up and top-down testing may be in appropriate testing strategies for object oriented systems. 5
3. (a) Describe two metrics that have been used to measure programmer productivity. Comment briefly on the advantages and disadvantages of each of these metrics. 10
- (b) Why should estimation technique be used to produce a cost estimate for a large complex software systems? 10
4. (a) Identify and briefly describe four types of requirements that may be defined for a computer based system. 8
- (b) (i) Suggest how an engineer responsible for drawing up a system requirement specifications might keep track of the relationships between functional and non-functional requirements. 6
- (ii) Describe four types of non-functional requirements that may be placed on a system. Give examples of each of these requirements. 6
5. (a) Using a data-flow diagram, describe a change management procedure that might be used in a large organization concerned with developing software for external clients, changes may be suggested either from external or internal sources. 10
- (b) (i) With reference to system building, explain why you may sometimes have to maintain obsolete computers on which large software systems were developed. 5
- (ii) Explain why an attribute based version identification system makes it easier to discover all of the components making up a specific version of a system. 5
6. (a) Why it may be necessary to design the system architecture before the specifications are written. 8
- (b) Giving reasons for your answer, suggest an appropriate structural model for the following systems : 12
- (i) An automated ticket-issuing system used by passengers at a railway station.
- (ii) A robot floor-cleaner that is intended to clean relatively clear spaces such as corridors, the cleaner must be able to sense walls and other obstructions.
7. (a) Giving reasons for your answer, suggest an appropriate control model for the following systems. 10
- (i) A batch processing system that takes information about hours worked and pay rates and prints salary slips and bank credit transfer information.
- (ii) A set of software tools that are produced by different vendors, but which must work together.
- (b) (i) Under what circumstances might an organization decide to scrap a system when the system assessment suggests that it is of high quality and high business value. 5
- (ii) What are the essential conditions for software re-engineering to be successful? 5