System Analysis and Design

BCA Third Semester

Unit I: System Development Fundamentals

1. What do you mean by system? Explain its characteristics.
2. Define system development along with methodologies, tools, and techniques with suitable example.
3. Describe about information system and its types providing examples.
4. Describe about developing information system and explain SDLC with its phases.
5. What are the products, outputs, or deliverables from each SDLC phases?
6. Explain traditional waterfall model with advantages and disadvantages.
7. When do we use traditional waterfall model approach in system development? Explain.
8. What is prototyping? Explain prototyping methodology with suitable figure and example.
9. What are different types of prototypes? Explain.
10. What are the pros and cons of prototyping?
11. When do we use prototyping approach in system development? Explain.
12. Describe CASE with its types.
13. How a CASE can be used in various phases of SDLC? Explain.
14. Define JAD. What are the pros and cons of JAD? Explain.
15. When do we use JAD in system development? Explain.
16. Explain about JAD participants and their roles.
17. Show some advantages and disadvantages of using JAD in system development.
18. What do you mean by RAD? Explain its phases in detail.
19. What are the pros and cons of using RAD approach?
20. When do we use a RAD model while developing a system? Explain.
21. Define SOA. Explain its framework.
22. What is the benefit of using SOA in system development? Explain.
23. Describe spiral model with a suitable diagram.
24. When do we use spiral model in system development? Explain.
25. What are the with advantages and disadvantages of using spiral model?
26. Describe agile development approach of a software.
27. How is agile methodology different from other software process models? Explain.
28. When do we use agile method while developing the system?
29. What is extreme programming? Explain its key principles.
30. What are extreme programming practices? Explain.
31. What is OOAD? Differentiate between structured methodologies and object-oriented methodologies.
32. Explain about system acquisition.
33. What is outsourcing? Give the reasons to outsource.
34. What are the sources of software? List them and explain any two.
35. What are information technology service firm? What is their development specialization? Explain with examples.
36. Who are packaged service producers? What is their software business sectors? Show some examples.
37. Explain enterprise solutions software. What do you understand by ERP? Explain.
38. Define application service provider and managed service provider.
39. Write short notes on open-source software.
40. Describe in-house development of a software.
41. Compare various sources of software components.
42. What are the most common criteria for selecting off-the-shelf software? Explain.
43. Explain request for proposal. What are the information sources for RFP?
44. Explain reuse in terms of object-oriented development and component-based development.
45. Describe different approaches to reuse.

46 What is a software project and project management? Explain.

47 Why is project management important? Briefly explain the activities performed by project manager during project execution.

48 Explain project management phases in detail.

49 What are the activities that are performed during project initiation?

50 What are the activities that are performed during project planning?

51 What are the activities that are performed during project execution?

52 What are the activities that are performed during project closedown?

53 Explain Gantt chart and its uses.

54 Describe how can you represent a project plan.

55 Explain PERT. When is it used?

56 What are the time estimates used in PERT to calculate activity durations? Explain.

57 What is a network diagram? What is the step in constructing a Gantt chart and PERT diagram?

58 Explain EST, EFT, LST, LFT in a PERT.

59 What is an activity? When is it said to be critical? Explain.

60 Explain critical path. How is it determined in PERT?

61 What do you understand by slack/float in PERT? How is a slack time/float time calculated in PERT?

62 What is total slack/total float? How is it calculated in PERT?

63 Show some differences between Gantt chart and PERT diagram.

64 A small project is composed of seven activities whose three time estimates and predecessors are listed in the table below:

Activity	Dependency (Predecessor)	t_0	t_m	t_p
A	-	12	16	26
B	A	6	9	18
C	A	8	10	18
D	C	2	3	4
E	B, D	3	4	11
F	E	6	8	10
G	F	15	20	25

(i) Calculate EST, LST, EFT, LFT and TF

(ii) Calculate total project duration i.e. completion time.

(iii) Show critical activities and critical path.

(iv) Formulate an activity-on-arrow network representation with these precedence relationships.

(v) Draw the Gantt chart of the project

65 A small project is composed of eight activities whose time estimates and predecessors are listed in the table below:

Activity	Duration (Weeks)	Dependency (Predecessor)
A	7	-
B	3	-
C	6	A
D	3	B
E	3	D, F
F	2	B
G	3	C
H	2	E, G

(i) Calculate EST, LST, EFT, LFT and TF

(ii) Calculate total project duration i.e. completion time.

(iii) Show critical activities and critical path.

(iv) Formulate an activity-on-arrow network representation with these precedence relationships.

(v) Draw the Gantt chart of the project

Unit II: Planning

66 Explain the system planning phase of SDLC in detail.
67 What are the primary activities of project identification and selection phase? Explain.
68 Explain the process of Identifying and selecting system development projects.
69 Describe the characteristics of alternative methods for making information systems identification and selection decisions.
70 What are the evaluation criteria when classifying and ranking projects? Explain.
71 What are the factors and outcomes that need to be considered while project selection decision is to be made? Explain.
72 What are the deliverables and outcomes from planning phase while considering both top-down and bottom-up initiatives? Explain with proper figure.
73 What is corporate strategic planning? Explain.
74 What is corporate information system planning? What does it involve? Explain.
75 What are mission statement and objective statement? Explain.
76 What are the competitive strategies used in corporate strategic planning? Explain.
77 "Information system planning is a three-step process". Explain this statement.
78 What do you understand by top-down and bottom-up planning in Information system planning?
79 Describe about process of initiating and planning IS development projects.
80 What is a project charter and explain its usability in project planning? What does it contain?
81 Explain baseline project plan and project scope statement.
82 List some elements of project planning.
83 Mention some deliverables and outcomes of planning phase.
84 Describe feasibility analysis. What are various types of project feasibility? List them.
85 What do you understand by economic feasibility? Explain.
86 Show the differences between tangible benefits and intangible benefits.
87 Show the differences between tangible cost and intangible cost.
88 Write short notes on: one-time cost and recurring cost.
89 How can a project cost be determined? What type of cost need to be considered? Explain.
90 Explain time value of money.
91 Explain net present value and its significance in economic feasibility.
92 Explain return on investment and its significance in economic feasibility.
93 Explain break-even analysis and its significance in economic feasibility.
94 What is a break-even point? Explain.
95 What do you understand by technical feasibility? Explain.
96 Mention some of the project risk factors while performing technical feasibility.
97 Describe operational feasibility.
98 Write short notes on: Schedule Feasibility, Legal and Contractual Feasibility, and Political Feasibility.
99 Explain structured walkthrough while reviewing the baseline project plan.
100 On the basis of NPV criterion, determine which project is the most worthwhile listed in table below:

Year	Project 1	Project 2	Project 3	Project 4
0	-1,00,000	-10,00,000	-1,00,000	-1,20,000
1	10,000	2,00,000	30,000	30,000
2	10,000	2,00,000	30,000	30,000
3	10,000	2,00,000	30,000	30,000
4	20,000	2,00,000	30,000	30,000
5	1,00,000	3,00,000	30,000	75,000
Net Profit	**50,000**	**1,00,000**	**50,000**	**75,000**

Note: 'Year 0' represents all the costs before system is operation and assume a 10% discount rate being provided.

101 On the basis of ROI criterion, determine which project is the most worthwhile listed in table below:

Year	Project 1	Project 2	Project 3	Project 4
0	-1,00,000	-10,00,000	-1,00,000	-1,20,000
1	10,000	2,00,000	30,000	30,000
2	10,000	2,00,000	30,000	30,000
3	10,000	2,00,000	30,000	30,000
4	20,000	2,00,000	30,000	30,000
5	1,00,000	3,00,000	30,000	75,000
Net Profit	**50,000**	**1,00,000**	**50,000**	**75,000**

Note: 'Year 0' represents all the costs before system is operation.

102 A restaurant named "PizzaHut" sells pizza. The selling price is $15 per pizza, and the monthly sales are 1,500 pizzas. Additionally, the following information for a month is being provided in the table below:

Particulars	Amount
Salaried Labor	$4,000
Rent	$3,000
Utilities	$1,300
Advertising	$700
Raw Materials	$8,000
Packaging Expense	$1,000
Selling price per pizza	$15

How many pizzas do PizzaHut need to sell in a month in order to achieve the break-even point?

Unit III: Analysis

103 Explain system analysis phase of SDLC in detail.
104 What are the deliverables for requirements determination?
105 Describe about the system requirement, system process requirement and system data requirement.
106 What are the traditional methods of determining requirements? List them and Explain any one method.
107 What are the advantages of interviewing in group when compared with individual interviewing?
108 Explain nominal group technique.
109 How can an interview be effective? What is its guideline? Explain.
110 What are the contemporary methods of determining requirements? List them and Explain any one method.
111 How can a CASE tool be used during JAD session? Explain.
112 How can a prototype be used during requirements determination? Explain.
113 What are the radical methods of determining requirements? List them and Explain any one method.
114 Explain Business Process Reengineering.
115 What do you understand by disruptive technology? Explain.
116 Explain in detail how agile methodologies can be applied for requirement determination.
117 What is process modeling? Explain.
118 What are the deliverables and outcomes of process modeling?
119 Explain about data flow diagram, its symbols and the importance of DFD.
120 Explain the DFD diagramming rules.
121 What are various levels of DFD? Explain.
122 Describe context diagram and the rule for constructing it.
123 Describe Level-0 DFD and the rule for constructing it.
124 Describe Level-1 DFD and the rule for constructing it.
125 What do you understand by functional decomposition? Explain.
126 How data flow diagram can be applied in requirement analysis?

127 Construct a Context Diagram, Level-0 DFD, and Level-1 DFD for “Hospital Pharmacy System”.

128 Assume you are working on the banking system. Prepare a context diagram and level-0 DFD of “Banking System” for amount deposition and withdrawal of amount from the cheque.

129 Draw a DFD of “College Library System” up to level 2.

130 Develop a context diagram and top level logical DFD for the system made up of the following:
B & B is a mail-order company that distributes CDs, DVDs of music, games, movies, software at discount prices to club members.

- When an order processing clerk receives an order form, he or she verifies that the sender is a club member by checking the member file.
- If the sender is not a member, the clerk returns the order along with a membership application form.
- If the sender is a member, the clerk verifies the order item data by checking the item file.
- Then the clerk enters the order data and saves it to the Daily Order file. The clerk also prints invoice and shipping list for each order, which are forwarded to Order fulfillment Department.

131 What do you understand by logic modeling? List some of the logic modeling tools.

132 Explain about decision tables and its importance in requirement analysis.

133 Why decision table is also referred to as process description tool? Explain.

134 Explain the procedure for creating decision tables.

135 Construct a decision table that represents a sales person commission. The rules are as follows:

- If fewer than 400 units are sold, then the sales person commission is 2% of total sales.
- If between 400-499 units are sold, then the sales person commission is 3% of total sales
- If 500 or more units are sold, and the sales person has been employed by the company for 1 year or less, then the sales person commission is 4% of total sales
- If 500 or more units are sold, and the sales person has been with the company for more than 1 year, then the sales person commission is 5% of total sales

136 Department of Transport Management (DoTM) is related with registration of the new vehicle and insurance of the vehicle. For the new vehicles the registration is done according to the type of vehicle (2/3/4 wheeler) and also according to (Light/Medium/Heavy).

- The registration of vehicle is done according to the following rules:
- If the vehicle type is any one and the weight is light then registration charges are Rs. 100.
- If the vehicle type is 3-wheeler and the weight is medium then the registration charges are Rs. 150 and if weight is heavy then the registration charges are Rs. 200.
- If the vehicle is 4-wheeler and the weight is medium then the registration charges are Rs. 200 and if weight is heavy the registration charges Rs. 300.

Carry out the decision analysis using decision table.

137 Explain about conceptual data modeling and its process.

138 What are the deliverables and outcome from conceptual data modeling? Explain.

139 How will a system analyst gather information for conceptual data modeling? Explain.

140 Describe ER model and ER diagram. Explain the importance of ERD.

141 Explain entity, weak entity, entity types, and entity instance with suitable example.

142 Explain attribute and its types with suitable example.

143 What is a relationship in an ERD? Explain its types with example.

144 What is degree of relationship? Explain its types with example.

145 What do you understand by cardinality in an ERD? Show with example.

146 Explain the steps in making an ER diagram with suitable example.

147 “A university consists of several faculties. Within each faculty there are several departments. Each department may run a number of courses. All teaching staffs are attached to departments, each staff member belonging to a unique department. Every course is composed of subcourses. Some subcourses are part of more than one course. Staff may teach on many subcourses and each subcourse may be taught by a number of staff.”
Draw an entity-relationship model for this example. Show attributes, cardinalities for all entities, relationship and also consider primary key for all entities if you think necessary.

148 Construct an ER Diagram for football club that has a name and a manager (identified by his name) manage a club. A footballer has a registration number, name and age. A club manager also buys players. Each club plays against other clubs in the league and matches have a data, venue and score.

149 "A lecturer, identified by his or her number, name and room number, is responsible for organizing a number of course modules. Each module has a unique code and also a name and each module can involve a number of lecturers who deliver part of it. A module is composed of a series of lectures and because of economic constraints and common sense, sometimes lectures on a given topic can be part of more than one module. A lecture has a time, room and date and is delivered by a lecturer and a lecturer may deliver more than one lecture. Students, identified by number and name, can attend lectures and a student must be registered for the number of modules. We also store the data on which the student first registered for that module. Finally, a lecturer acts as a tutor for a number of students and each student has only one tutor."
Draw an entity-relationship model for this example. Show attributes, cardinalities for all entities, relationship and also consider primary key for all entities if you think necessary.

150 Explain supertype and subtype. What are the rules for supertype and subtype relationships?

151 What are business rules, domains and triggering operations in conceptual data modeling?

152 Explain packaged data model along with its types.

Unit IV: Design

153 Explain system design phase of SDLC in detail.

154 What are the major activities in system design? List them all.

155 Explain about the process of database design.

156 What are the key steps in logical database design? Explain.

157 What are the key steps in physical database design? Explain.

158 Show some deliverables and outcomes of system design phase.

159 Describe Relational Database Model.

160 Define Well-Structured Relation with suitable example.

161 Explain the normalization process with its importance in database design.

162 What is unnormalized design? Explain with example how the unnormalized table can be normalized into 1NF, 2NF, and 3NF tables.

163 How can an ER diagram be transformed into relation? Illustrate with an example.

164 What do you understand by merging relation? Show this with a proper example.

165 What may be the problem that can arise while merging a relation? Explain.

166 Describe file organization and its objectives.

167 Show some differences between Sequential File Organization and Indexed Sequential File Organization.

168 Explain Hashed File Organization technique.

169 Explain Inverted List File Organization technique.

170 Explain Direct-Access File Organization technique.

171 Describe form and report.

172 Explain some types of report.

173 Explain about the process of designing forms and reports.

174 What are the deliverables and outcomes designing forms and reports?

175 List some of the formatting guidelines for forms and reports designing.

176 What are the general design guidelines for usability of forms and reports? Explain.

177 Describe interfaces and dialogues.

178 Explain about the process of designing interfaces and dialogues.

179 What are the deliverables and outcomes of designing interfaces and dialogues?

180 What are the methods of interacting in an interface? Explain them.

181 How can you design the Dialogue Sequence? Explain.

Unit V: Implementation and Maintenance

182 Explain the system implementation phase of SDLC.

183 What are the major activities that are performed in system implementation phase? Explain.
184 What are the deliverables for Coding, Testing, and Installation? List them.
185 What are the deliverables for Documenting the System, Training, and Supporting Users? List them.
186 Explain about software application testing.
187 How a software application testing is done in system analysis, system design and system implementation phases? Explain.
188 What are different types of software application test? List and explain them.
189 Show the differences between Unit Testing and Integration Testing.
190 Show the differences between Integration Testing and System Testing.
191 What is an acceptance test? Explain.
192 Show the differences between Alpha Testing and Beta Testing.
193 Differentiate between black box testing and white box testing.
194 Describe installation process in detail along with the types/approaches of installation.
195 Describe documentation and explain the importance of documentation in the SDLC.
196 Explain the types of documentation with examples.
197 Describe training and supporting users in implementation phase.
198 List out the organizational issues in system implementation.
199 Explain system maintenance phase of SDLC in detail.
200 “Maintenance is an on-going process”. Do you agree? Elaborate.
201 Explain the process of maintaining information systems.
202 What are the deliverables and outcome of system maintenance phase?
203 Explain the types of maintenance.
204 Describe cost of maintenance in detail.
205 How a maintenance can be managed? Explain.
206 How can you measure the effectiveness of maintenance? Explain.
207 How the maintenance requests can be prioritized and controlled?
208 Describe configuration management in system maintenance phase.
209 Write short notes on: Reverse engineering and Re-engineering.