PURBANCHAL UNIVERSITY
2024

Bachelor in Information Technology (B.I.T.)/Sixth Semester/*Final*

Time: 03:00 hrs. Full Marks: 80/Pass Marks: 32

BIT355CO: Software Engineering *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

2×12=24

Answer TWO questions.

1. ABC is an international software house. ABC is currently working on a project that is totally new for the development team and even the client is confused about the requirements of this project. Hence this company is facing difficulties because they fail to apprehend user requirements properly. For this project, it is decided to build a sample application and show it to the client for feedback. In the context of this above scenario as a project manager what will be the choice of the software lifecycle model and why? Explain all the phases of that software lifecycle model with advantage and disadvantage.

2. Explain the process of requirement engineering. Differentiate between functional and non-functional requirements of a system. Mention any two non-functional requirements of software to be developed. 6+3+3

3. Differentiate between software verification and software validation. Explain statement coverage and path coverage for white-box testing. 4+8

Group B

7×8=56

Answer SEVEN questions.

4. Distinguish software engineering from other engineering disciplines. Briefly explain the generic view of software engineering. 3+5

5. What are the methods of estimating project parameters? Explain how a COCOMO can be used to estimate the effort and development time of a software project. 2+6

Contd. ...

6. What are the different types of architectural styles that exist for software? Explain any one software architecture in detail. 3+5

7. What is Software Quality Assurance? Explain various metrices used in assessing the software quality. 2+6

8. Discuss cloud computing with its advantages. How does it differ from grid computing? 4+4

9. Explain the activities of the project planning process. Why is project scheduling important and what are the several project scheduling techniques? Explain. 2+6

10. Explain why software testing is a very important step in the software development lifecycle? Explain various types of integration testing techniques mentioning their strengths and weaknesses. 2+6

11. Write Short Notes on Any TWO: 2×4=8

(a) Data Flow Diagram

(b) Software Configuration Management

(c) Object Oriented Software Engineering

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Time: 03:00 hrs. Full Marks: 80/Pass Marks: 32

BIT353CO: Data Warehousing and Mining *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions. **2×12=24**

1. A data warehouse is a subject-oriented, integrated, time-variant, non-volatile collection of the data in support of the management's decision making process. Explain each term used with their relevant meaning with respect to the data warehouse.

2. What is Apriori algorithm? Identify the candidate, large item sets and also derive association rule of the following transaction table using Apriori algorithm with Minimum Support=50% and Minimum Confidence=50%. 2+10

Transaction ID	Items Bought
T1	Tea, Biscuit
T2	Coke, Bread, Butter
T3	Tea, Bread, Butter
T4	Tea, Bread, Peanut
T5	Coke, Biscuit, Peanut
T6	Bread, Butter

3. Explain about classification and prediction. Explain three major steps of genetic algorithm with example. 6+6

Group B

Answer SEVEN questions. **7×8=56**

4. What is data mining? Explain KDD process. 2+6

5. Define OLAP. Explain data preprocessing. 2+6

6. Explain Market Basket Analysis. How Multilevel Association Rule Mining technique solves the problem of traditional data mining? 4+4

Cont. ...

7. How Euclidian distance differ from Manhattan distance? Calculate L1 and L2 distance from the given data points. 2+6

Data Point/Parameter	Age (year)	Yearly Income($)	Bank Balance ($)
Data Point 1	80	85000	8400
Data Point 2	60	61000	6200

8. Explain working mechanism of classification by decision-tree induction with example.

9. What is clustering? Divide data value (2, 3, 6, 8, 9, 22, 23, 25, 32, 34, 38) into three clusters using k-means clustering algorithm. 2+6

10. Explain hierarchical method of cluster analysis with a suitable example.

11. Write short notes on Any TWO: 2×4=8

(a) Data mining primitives

(b) Three-tier data warehouse architecture

(c) Classification by back-propagation

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Time: 03:00 hrs. Full Marks: 80/Pass Marks: 32

BIT354CO: Simulation & Modeling *(New Course)*

Candidates are required to give their answers in their own words as far as practicable. Figure in the margin indicate full marks.

Group A

Answer TWO questions. **2×12=24**

1. What are the distinct phases of a comprehensive simulation study? Explain the tasks that each phase encompasses.
2. What are the properties of random number? The sequence of numbers 0.54, 0.73, 0.98, 0.11 and 0.68 has been generated. Use the Kolmogorov-Smirnov test $\alpha=0.05$ to determine if the hypothesis that the numbers are uniformly distributed on the interval 0 to 1 can be rejected.
   (Note that the critical value of D for $\alpha=0.05$ and $N=5$ is 0.565)

3(a) Explain about Kendal's notation with an example.

(b) Write down the applications of real-time simulation.

Group B

Answer SEVEN questions. **7×8=56**

4. Discuss about the limitations or challenges of using simulation languages for modeling complex systems.
5. What are continuous and discrete systems, and what types of systems do they represent? Give examples.
6. What do you mean by Poker test? Write the significance of testing numbers for randomness in statistical analysis.
7. What is a queuing system and what are the key components involved?
8. Describe Monte Carlo simulation and state the scenarios of using Monte Carlo method over other simulation methods.
9. Define and describe Markov chain with example.
10. What are the different estimation methods used in analyzing simulation output? Elaborate on the process of estimating internal bias in simulation.
11. List any five circumstances when the simulation is appropriate tool and when it is not.

11. Write short notes on: 2×4=8

(a) Hybrid simulation

(b) Use of partial differential equation in simulation model

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Bachelor in Information Technology (B.I.T.)/Sixth Semester/Final

Time: 03:00 hrs. Full Marks: 80/Pass Marks: 32

BIT351CO: Artificial Intelligence *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions. **2×12=24**

1. What is searching and why it is important in AI? Explain depth-first search, depth-limited search and iterative-deepening search with suitable examples. 3+9

2(a) Define natural language processing. Explain the steps involved in natural language processing with example. 3+5

(b) Construct a parse tree for the following sentence: 4
"The train passed the station in the early morning."

3. Explain the network structure of an artificial neutral network. Write the significance of Boltzmann machines in Artificial Intelligence. 8+4

Group B

Answer SEVEN questions. **7×8=56**

4. Briefly explain the types of AI agents. Discuss PEAS description for automated aircraft agent with example. 4+4

5. Highlight the problems of Min-Max search with suitable example. Explain alpha-beta pruning algorithm. 5+3

6. Define constraint satisfaction problem (CSP). Stating necessary conditions and assumptions, solve the following crypto-arithmetic problem. 2+6

$$\begin{array}{r} \text{ONE} \\ +\ \text{TWO} \\ \hline \text{FOUR} \end{array}$$

Cont. ...

7. What is knowledge representation? What are the different types of knowledge? Represent the following sentences in semantic network. 2+2+4

(a) Birds are animals.

(b) Birds have feathers, they fly and lay eggs.

(c) Albatross is a bird.

(d) Donald is a bird.

(e) Tracy is an Albatross.

8. Convert the following sentences into FOPL:

(a) Anyone passing the exam and winning the lottery is happy.

(b) Mary is so intelligent; she always tops the exam.

(c) Rajan bought a car but he doesn't drive.

(d) Everyone likes ice-cream, but someone likes singing.

9. Define reasoning and write about uncertainty in reasoning. Explain the importance of Bayesian network. 5+3

10. How does predicate logic differs from propositional logic? Explain with suitable examples.

11. Write short notes on Any TWO: 2×4=8

(a) Forward and backward chaining

(b) Application and challenges of AI

(c) Supervised and unsupervised learning

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BIT352CO: Management Information System *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

Figure in the margin indicate full marks.

Group A

Answer TWO questions. **2×12=24**

1. How are organizations and information systems related? Write and explain the impacts of information system on organization.
2. What is decision support system (DSS) and what are its benefits? Explain the components of DSS.
3. Define management information system (MIS). Describe the characteristics of MIS and explain how MIS differs from other information systems.

Group B

Answer SEVEN questions. **7×8=56**

4. Differentiate between information technology and information systems. What are globalization opportunities?
5. What is business intelligence and how can it be used to improve business performance?
6. Explain technologies and tools for protecting information resources.
7. Define CRM and mention its different phases. Discuss some applications of CRM.
8. Explain strategic information systems and strategic information systems plan?
9. What do you mean by executive information system (EIS)? Explain few applications of EIS.
10. Explain the IT infrastructure components.

Cont. ...

11. Briefly discuss about some functional information systems that support smooth running of a business.

12. Write short notes on any TWO: $2 \times 4 = 8$

(a) Business value-chain model

(b) Enterprise systems

(c) Quality information system