

Total No. of Questions : 8]

P7853

SEAT No. :

[Total No. of Pages : 2

[6181]-412

B.E. (AI & DS)

UI/UX DESIGN

(2019 Pattern) (Semester-VII) (Elective-IV) (417524C)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Figures to the right indicate full marks.
- 3) Assume Suitable data if necessary.
- 4) Neat diagram must be drawn wherever necessary.

Q1) a) Explain different human considerations in design. **[6]**

b) Explain golden rules of Interface design. **[6]**

c) How to evaluate Interface design? **[6]**

OR

Q2) a) Explain with an example Usability testing. **[6]**

b) How do you approach designing for mobile applications? **[6]**

c) What is information architecture and its importance in UI design? **[6]**

Q3) a) What is direct manipulation? Explain different advantages and disadvantages. **[6]**

b) Write a short note on-Phrasing the Menu. **[6]**

c) Differentiate between menu bar and toolbar. **[5]**

OR

Q4) a) Write a short note on-Interaction with natural language. **[6]**

b) Enlist different interaction styles. **[6]**

c) Explain WIMP in detail. **[5]**

P.T.O.

- Q5)** a) Write a short note on-Selection of controls. [6]
b) Explain drop down and pop up list boxes. [6]
c) Explain operable controls in detail. [6]

OR

- Q6)** a) What is presentaiton control? [6]
b) Explain individual windows design and multiple windows design. [6]
c) Explain command menus in detail. [6]

- Q7)** a) What is usability testing? [6]
b) Explain Cognitive walkthrough in detail. [6]
c) Explain different challenges for information visualization. [5]

OR

- Q8)** a) Differentiate between usability testing and user testing. [6]
b) Write a short note on Eye tracking and A/B testing. [6]
c) Explain Think Aloud protocol in detail. [5]



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B.E. (Artificial Intelligence and Data Science)
QUANTUM ARTIFICIAL INTELLIGENCE
(2019 Pattern) (Semester - VII) (417523A) (Elective - III)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Solve questions Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data if necessary.*

- Q1)** a) Describe Shor's Algorithm with example. [6]
b) Explain Simon's Algorithm. [6]
c) Explain Factoring Integers, with example. [6]

OR

- Q2)** a) Describe Grover's Algorithm with example. [6]
b) Discuss analysis of Deutsch algorithm in details. [6]
c) Write a short note on: Phase Kick-Back. [6]

- Q3)** a) Explain in details quantum support vector machines. [6]
b) Explain Nearest Neighbour Search in detail. [6]
c) Explain in detail - Quantum Boosting. [6]

OR

- Q4)** a) Write a short note on: Variational Quantum Algorithms. [6]
b) Explain Quantum Neural Networks. [6]
c) Describe classification in quantum machine learning with examples. [6]

- Q5)** a) What are some practical challenges and limitations associated with error model encoding in quantum computing. [6]
b) Describe Quantum Key Distribution in short. [6]
c) Discuss the Classical Three-Bit Code. [5]

OR

P.T.O.

- Q6)** a) Explain in short Quantum Dense Coding. [6]
b) Discuss in detail Quantum cryptography. [6]
c) Write a short Note on Fault Tolerance. [5]

- Q7)** a) Write short note on Quantum Walk. [6]
b) Explain Quantum Neural Computation. [6]
c) Write a short note on Quantum Tree Search. [5]

OR

- Q8)** a) State the challenges and limitations are associated with quantum computing in data sciences. [6]
b) Explain Quantum Production System in detail. [6]
c) Describe the Heuristic Search with example. [5]



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B.E. (Artificial Intelligence & Data Science)

INFORMATION RETRIEVAL

(2019 Pattern) (Semester - VII) (417524 B) (Elective - IV)

Time : 2 ½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Assume suitable data if necessary.*

- Q1)** a) Define and explain Probabilistic Retrieval. [6]
b) What is the probability ranking principle for interactive information retrieval? [6]
c) What is the binary independent retrieval model? [6]

OR

- Q2)** a) What is language modeling approach to information retrieval? [6]
b) State and explain different types of Bayesian networks? [6]
c) Explain language models? [6]

- Q3)** a) What is the difference between clustering and classification? Can clustering be used for classification purposes? [6]
b) What are different types of clustering algorithm? Explain any one of them. [5]
c) What are the applications of naive Bayes classifier? [6]

OR

- Q4)** a) What is K nearest neighbor classifier with an illustration in information retrieval? [6]
b) What are the different types of agglomerative clustering? [5]
c) What is the hypothesis used in the vector space model for classification? [6]

P.T.O.

- Q5)** a) Factors that influence a webpage's PageRank score. [6]
b) Explain search engine ranking function? [5]
c) What is parallelism in query processing? [6]

OR

- Q6)** a) Define Python library is used for web crawling? [6]
b) What are the Main challenges posed by Web? [5]
c) Explain the components of focused web crawlers? [6]

- Q7)** a) Explain multimedia IR models? [9]
b) What are the four phases of recommender system? [9]

OR

- Q8)** a) Multimedia Information Retrieval. [9]
b) What is the difference between information retrieval and recommender system? [9]



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B.E. (Artificial Intelligence and Data Science)

INDUSTRIAL INTERNET OF THINGS

(2019 Pattern) (Semester - VII) (417523B) (Elective - III)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Solve questions Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume suitable data if necessary.*

Q1) a) Describe the functions of the following IIoT components: [6]

- i) Sensors
- ii) Gateways
- iii) Routers

b) What is a cloud broker and why is it used in IIoT? [6]

c) How can WSNs be used to collect data from industrial environments?[6]

OR

Q2) a) Describe the functions of the following IIoT components: [6]

- i) Modems,
- ii) Cloud brokers
- iii) Servers

b) Explain the difference between a sensor and a transducer. [6]

c) Explain the importance of data filtering and aggregation at the IIoT sensing layer. [6]

Q3) a) Explain how IIoT cloud platforms can be used to enable remote monitoring and control of industrial assets. [6]

b) Compare and contrast the different features of leading IIoT cloud platforms (e.g. Predix, PTC ThingWorx, Microsoft Azure). [6]

c) Describe the process of designing and developing a digital twin. [6]

OR

P.T.O.

- Q4)** a) Identify the key factors to consider when choosing an IIoT cloud platform. [6]
b) Discuss the challenges and benefits of using an IIoT cloud platform to implement a digital twin. [6]
c) Assess the security and privacy challenges associated with IIoT cloud platforms. [6]

- Q5)** a) Compare and contrast different message integrity protection mechanisms for IIoT systems. [9]
b) Select and implement an appropriate identity establishment mechanism for a given IIoT application. [8]

OR

- Q6)** a) Describe how to ensure the integrity of messages in a given IIoT system. [9]
b) Define the following IIoT security components: [8]
i) identity establishment
ii) access control
iii) non-repudiation
iv) availability

- Q7)** a) Explain how smart robots can be used to improve the efficiency and productivity of industrial processes. [9]
b) Assess the challenges and benefits of implementing cyber manufacturing systems in different industries. [8]

OR

- Q8)** a) Describe the concept of Industry 5.0 (Society 5.0). How does it build upon Industry 4.0, and what new societal challenges and opportunities does it aim to address? [9]
b) Define the terms : [8]
i) smart metering
ii) smart irrigation
iii) smart office
iv) smart logistics



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B.E. (AI & DS)

MACHINE LEARNING

(2019 Pattern) (Semester - VII) (417521)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to right indicate full marks.

- Q1) a)** Apply K-Nearest Neighbor Algorithm (KNN) on following data. Predict the student result for values physics = 6 marks, Chemistry = 8 marks. Consider number of neighbours K = 3 and Euclidean Distance as distance measure. [12]

Physics (marks)	Chemistry (marks)	Results
4	3	Fail
6	7	Pass
7	8	Pass
5	5	Fail
8	8	Pass

- b) Explain support Vector Machine classification algorithm with suitable example. [6]

OR

- Q2) a)** Explain any 4 evaluation measures of Binary classification with example? [6]
- b) Explain construction of multi-classifier. [6]
- i) One Vs. All approach
 - ii) One Vs One approach
- c) Differentiate between Binary - vs - Multiclass Classification. [6]

P.T.O.

Q3) a) Explain K - Means clustering algorithm and states the advantages and disadvantages of k-means clustering algorithm. [9]

b) Explain Gaussian mixture model with example. [8]

OR

Q4) a) Elaborate need of clustering and explain how the elbow method is used to decide the value of cluster k. [9]

b) Explain Divisive Hierarchical clustering (DHC) algorithm with example. [8]

Q5) a) Differentiate the Bagging and Boosting approach of ensemble learning. [6]

b) Explain different types of voting mechanisms in ensemble learning. [6]

c) Explain AdaBoost algorithm in detail. [6]

OR

Q6) a) Compare Homogeneous and Heterogeneous ensemble methods. [6]

b) What is the ensemble learning? Explain any two ensemble learning techniques. [6]

c) Explain random forest ensembles with an example. [6]

Q7) a) Explain following terms: [8]

i) Markov Property

ii) Bellman Equation

iii) Markov Reward Process

iv) Markov Chain

b) Explain Q-Learning algorithm with an example. [9]

OR

Q8) a) What is Reinforcement Learning? Explain the real time applications of reinforcement learning. [8]

b) Explain following terms : [9]

i) Supervised Learning.

ii) Unsupervised Learning.

iii) Reinforcement Learning.

