

Question Paper

Exam Date & Time: 29-Dec-2023 (02:00 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER MSc. (SYSTEMS BIOLOGY) DEGREE EXAMINATION - DEC 2023 / JAN 2024
SUBJECT: MSB 601 MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE
(OBE-2021 REVISED REGULATION - REGULARS)

Marks: 70

Duration: 180 mins.

Answer all the questions.

Illustrate where necessary.

- 1) Define machine learning. Classify machine learning techniques with examples. (14)
- 2) Describe the hierarchical clustering algorithm with its evaluation methods. Explain the working of dendrogram with an example. (14)

Explain the following briefly:

- 3A) Explain the components of artificial intelligence. (7)
- 3B) What is the Hidden Markov Model? Explain in detail the applications of Hidden Markov Model. (7)
- 4A) What are the challenges in implementing Bayesian model? What are the strategies to overcome these challenges? (7)
- 4B) Explain any three advantages and disadvantages of Support Vector Machine. (7)

5. Write short notes on the following:

- 5A) **Define the following terminologies:** (3.5)
- Agent()
 - Environment()
 - Action()
 - State()
- 5B) **Add a note on:** (3.5)
- Prior
 - Likelihood
 - Posterior
- 5C) Define Geometric margin for the points (X_i, Y_i) . (3.5)
- 5D) **Define the following:** (3.5)
- Trajectory.
 - Transition probability.

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Question Paper

Exam Date & Time: 27-Dec-2023 (02:00 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER MSc. (SYSTEMS BIOLOGY) DEGREE EXAMINATION - DEC 2023 / JAN 2024
SUBJECT: MSB 605 BIG DATA ANALYSIS
(OBE-2021 REVISED REGULATION - REGULARS)

Marks: 70

Duration: 180 mins.

Answer all the questions.

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| 1A) | Explain the installation and usage of the SeqinR package. | (3.5) |
| 1B) | Add a note on R packages for differential gene expression studies. | (3.5) |
| 1C) | Define statistical analysis. Explain the types of statistical analysis. | (3.5) |
| 1D) | Add a note on the application of R in data analysis. | (3.5) |
| 2A) | Write a note on parallel processing and distributed storage systems. Explain the 4 V's of big data. | (7) |
| 2B) | Explain correlation and regression analysis. | (7) |
| 3A) | Write a note on data mining techniques. | (7) |
| 3B) | Add a note on operators and control structures in R programming. | (7) |
| 4) | Explain the components of Hadoop ecosystem. | (14) |
| 5) | Explain how databases are contributing in data management and knowledge discovery process. | (14) |

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