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UG0801

Roll No. 117792
BCA-75T-301

B.C.A Three/Four Year Fifth Semester Examination-Dec.2025

(Faculty of Science)

Subject-BCA

Artificial Intelligence & Machine Learning

Time Allowed : Three Hours

समय सीमा : तीन घंटे

Maximum Marks: 80

अधिकतम अंक: 80

No supplementary answer-book will be given to any candidate. The candidates should write the answer precisely in the main answer-book only.

किसी भी परीक्षार्थी को पूरक उत्तर-पुस्तिका नहीं दी जाएगी। अतः परीक्षार्थियों को समस्त प्रश्नों के उत्तर मुख्य उत्तर-पुस्तिका में ही लिखने चाहिए।

Answers to short answer-type questions must be given in sequential order. Similarly, all the parts of one question of descriptive part should be answered in one place in the answer-book.

लघुत्तरात्मक प्रश्नों के उत्तर प्रश्नों के क्रमानुसार ही दें। इसी प्रकार किसी भी एक वर्णनात्मक प्रश्न के अन्तर्गत पूछे गए विभिन्न प्रश्नों के उत्तर उत्तर-पुस्तिका में एक ही स्थान पर क्रमानुसार हल करने चाहिए।

Write your roll number on question paper before start writing answers of questions.

प्रश्नों के उत्तर लिखने से पूर्व प्रश्न-पत्र पर अपना रोल नम्बर अवश्य लिखिए।

Question Paper consists of two parts A and B.

प्रश्न पत्र में दो भाग अ और ब होंगे।

PART-A:20 mark भाग-अ: 20 अंक

Part A is compulsory having 10 very short answer-type questions (with a limit of 20 words) of two marks each. The first question is based on knowledge, understanding, and applications of the topics/text covered in the syllabus.

भाग अ में दो अंक के 10 अति लघुउत्तरीय प्रश्न (20 शब्दों की सीमा के साथ) अनिवार्य हैं। पहला प्रश्न पाठ्यक्रम में शामिल विषयों/पाठ के ज्ञान, समझ और अनुप्रयोगों पर आधारित है।

PART-B : 60 marks भाग-ब: 60 अंक

Part B of the question paper is divided into four units comprising question numbers 2-5. There is one descriptive question from each unit with internal choice. Each question will carry 15 marks.

प्रश्न पत्र का भाग ब प्रश्न संख्या 2-5 सहित चार इकाइयों में विभाजित है। प्रत्येक इकाई से आंतरिक विकल्प के साथ एक वर्णनात्मक प्रश्न है। प्रत्येक प्रश्न 15 अंक का है।

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P.T.O.

Part-A

1. (a) Define artificial Intelligence and write any two applications.

(10×2=20 marks)

(b) List the qualities of an artificial agent.

(c) Why heuristics search techniques are considered to be powerful than the traditional search techniques?

(d) What are the features of uninformed search?

(e) Differentiate between A* and AO* algorithm.

(f) Differentiate between procedural knowledge and declarative knowledge.

(g) What are the important objectives of machine learning?

(h) State the difference between classification and regression method.

(i) State the significance of Gaussian mixture model?

(j) What is the role of centroids in the k-means algorithm?

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Part-B

Unit-I

2. Summarize the various characteristics of AI. List out the various applications of artificial Intelligence and explain their use in various domains. (15)

OR

- Enumerate classical "Water jug problem". Describe the state space for this problem and also give the solution. (15)

Unit-II

3. What is knowledge representation in AI? List two challenges in knowledge representation? Express the issues that arise while using knowledge representation in artificial intelligence [15]

OR

- Discuss the following search techniques with the help of an example. Also discuss the benefits and short coming of each. [15]

- (i) Breadth First Search
- (ii) Depth First Search

Unit-III

4. Explain various learning techniques involved in supervised machine learning. [15]

OR

Elaborate on logistics regression with an example. Explain the process of computing co-efficients. [15]

Unit-IV

5. (a) Analyze the applications of clustering and identify advantages and dis-advantages of clustering algorithms. [10]

(b) What is the purpose of the Expectation-Maximization algorithm in GMM? [5]

OR

Write short notes on followings :- [3×5=15]

(a) Hidden Markov Model (HMM)

(b) Naive Bayer Classifier .

(c) Bayesian Network
