Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 121 /

## NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA

**Instructions for Students / Faculty**

**Mid Term I (Total 60 Marks, 2 HRS. Syllabus from Unit-1)**

- Part A: Total number of questions to be given are six (3 from CO1 and 3 from CO2), each carrying 2 marks and are compulsory to attend. There is no choice. They are short answer type questions **(Not More Than 25 Words for Both Question & Answer)**, no objective type or fill in the blanks. Total 12 marks.

- Part B: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student has to answer four (2 from CO1 and 2 from CO2). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 4 marks. Total 16 marks.

- Part C: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student has to answer four (2 from CO1 and 2 from CO2). They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question)***, each carrying 8 marks. Total 32 marks.

**Mid Term II (Total 90 Marks, 2.5 HRS., Syllabus from Unit-2)**

- Part A: Total number of questions to be given are ten (5 from CO3 and 5 from CO4), each carrying 3 marks and are compulsory to attend. There is no choice. They are short answer type questions **(Not More Than 25 Words for Both Question & Answer)**, no objective type or fill in the blanks. Total 30 marks

- Part B: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student has to answer four (2 from CO3 and 2 from CO4). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 6 marks. Total 24 marks.

- Part C: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student has to answer any four (2 from CO3 and 2 from CO4). They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question)***, each carrying 9 marks. Total 36 marks.

**Mid Term III (Total 90 Marks, 2.5 HRS., Syllabus from Unit-3)**

- Part A: Total number of questions to be given are ten (5 from CO5 and 5 from CO6), each carrying 3 marks and are compulsory to attend. There is no choice. They are short answer type questions **(Not More Than 25 Words for Both Question & Answer)**, no objective type or fill in the blanks. Total 30 marks

- Part B: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 6 marks. Total 24 marks.

- Part C: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6). They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question)***, each carrying 9 marks. Total 36 marks.

*** LIST OF ELABORATIVE THEORY QUESTION SUBJECTS**: 3 MH4 - 07 Manufacturing Process, 4 AN4 - 06 Aircraft Materials and Processes (Cr 3), 5 AN4 - 05 Aircraft System (Cr 3), 6 AN4 - 05 Avionics-I (Cr 3), 6 MH4 - 03 Applied Hydraulics & Pneumatics (Cr 3), 6 MH5 - 11 Principles of Management (Cr 3), 6 MH5 - 13 Aircraft Electronics System (Cr 3), 7 AN5 - 12 Maintenance of Airframe and System (Cr 3), 7 AN5 - 13 Helicopter Theory (Cr 3), 7 AG6 - 60.1 Human Engineering and Safety (Cr 3), 7 ST - 01 Avionics II (Special Theory Subject) (Cr 3), 7 MH5 - 11 Design of Mechatronics Systems (Cr 3), 7 MH5 - 12 Robotics and Machine Vision System (Cr 3), 7 MH6 - 13 Medical Electronics (Cr 3), 7 AN6 - 60.1 Aircraft Avionic System (Cr 3), 8 AN5 - 12 Maintenance of Power Plant and System

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(Cr 3), 8 AN5 - 13 Unmanned Aerial Vehicles & Systems (UAV) (Cr 3), 8 MH5 - 13 Product Development & Launching (Cr 3), 8 EC6 - 60.2 Robotics and control (Cr 3)

**Instructions For Faculties**

There should be total 6 Course Outcomes (COs) for each subject.

- Mid Term Question Papers are to be submitted as per Course Outcomes (COs) which should be divided equally in Part A, Part B and Part C according to Mid Term Examination and Credit Point.
- In Mid Term-1, the questions are to be given from CO1 and CO2. In Mid Term-2, the questions are to be given from CO3 and CO4. Similarly, in Mid Term-3, the questions are to be given from CO5 and CO6.
- **FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'C' OF QUESTION PAPER**

**INSTRUCTION FOR STUDENTS**

- **STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF EXAM,**

**QUESTION PAPER & STUDENTS DETAILS**

| | | | |
|---|---|---|---|
| **Type of Exam** | Mid Term 3 | **Date of Submission** | 26/06/2021 |
| **Name of Faculty** | Dr. M.F. Akhtar | **Date of Examination** | 29/06/2021 |
| **Course** | B.Tech (Mechatronics Engineering) | **Semester** | SEMESTER : 8 |
| **Batch** | Fourteenth (14) | **Subject** | 8 MH5 - 12 Artificial Intelligence (Cr 3) |

**COURSE OUTCOMES FOR REFERENCE TO FRAME QUESTION PAPERS**
**(Faculties are required to mention Course Outcome Number against each part of the question paper)**

| | | | |
|---|---|---|---|
| **Course Outcome** | CO 5: Design and implement appropriate solutions for search problems and planning problems.<br>CO 6: Implementation and application of machine learning techniques in prediction problems. | | |
| **Email I'd** | fahim@soaneemrana.org | **Phone No.** | 852-108-9715 |
| **Student Name** | | **Student Reg No.** | |

**PART A**

**All the questions are compulsory to attend.**

| | |
|---|---|
| **1. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.** | CO 5 |
| **Question : 1** | Identify and process objects and videos in the vision of AI. |

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| | | | |
|---|---|---|---|
| 39 | Learning | A Modern Approach Russell and Norvig | |
| **Question : 2** | Write the function of 'NEURON' in ANN. | | |
| 33 | ANN | A Modern Approach Russell and Norvig | |
| **Question : 3** | Define robotics in AI. | | |
| 40 | Robotics | TEXT BOOK | |
| **Question : 4** | Which method is preventing noise and overfitting in the decision tree? Explain it. | | |
| 26 | Decision Tree | TEXT BOOK | |
| **Question : 5** | Define uncertainty with an example. | | |
| 27 | Uncertain Knowledge and Reasoning | TEXT BOOK | |
| **2. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.** | | | CO 6 |
| **Question : 6** | Write the applications of NLP. | | |
| 38 | AI NAPPLICATIONS | TEXT BOOK | |
| **Question : 7** | Explain atomic propositions and compound propositions with a syntax of FOPL. | | |
| 37 | FOP | TEXT BOOK | |
| **Question : 8** | Explain inductive learning with an example. | | |
| 35 | Learning | TEXT BOOK | |
| **Question : 9** | Explain Bayesian Reasoning with an example. | | |
| 30 | Reasoning | TEXT BOOK | |
| **Question : 10** | Describe handling of uncertain knowledge. | | |
| 28 | Uncertain Knowledge and Reasoning | TEXT BOOK | |

**PART B**

**FOR MIDTERM 1 - Part B**: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2).
**FOR MIDTERM 2 - Part B**: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student must answer four (2 from CO3 and 2 from CO4).
**FOR MIDTERM 3 - Part B**: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6).

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| **3. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.** | CO 5 |

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| | | | |
|---|---|---|---|
| **Question : 1** | Write divisive algorithm with an example. | | |
| 34 | Learning | TEXT BOOK | |
| **Question : 2** | Explain inference and logic of AI with an example. | | |
| 23 | Probabilistic reasoning and uncertainty | TEXT BOOK | |
| **Question : 3** | Summerize the function of Bayes' rule in uncertainty reasoning. | | |
| 32 | Probabilistic reasoning and uncertainty | TEXT BOOK | |
| **4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.** | | | CO 6 |
| **Question : 4** | Explain the activation function of ANN. | | |
| 24 | Neural Network | TEXT BOOK | |
| **Question : 5** | Explain the representation of knowledge in an uncertain domain with an example. | | |
| 25 | Uncertainty | TEXT BOOK | |
| **Question : 6** | Write an algorithm of a decision tree. | | |
| 34 | Decision Tree. | TEXT BOOK | |
| **Question : 7 (Old Pattern)** | | | |
| | | | |

**PART C**

**FOR MIDTERM 1 - Part C**: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2).
**FOR MIDTERM 2 - Part C**: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student must answer four (2 from CO3 and 2 from CO4).
**FOR MIDTERM 3 - Part C**: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6).

| | | | |
|---|---|---|---|
| **5. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.** | | | CO 5 |
| **Question : 1** | Implement and design an intelligent robot that can perform a complex task, and it can sense the environment and react accordingly. | | |
| 38 | Robotics | TEXT BOOK | |
| **Question : 2** | Given the following statistics, what is the probability that a woman has cancer if she has a positive mammogram result? • One percent of women over 50 have breast cancer.<br>• Ninety percent of women who have breast cancer test positive on mammograms.<br>• Eight percent of women will have false positives | | |

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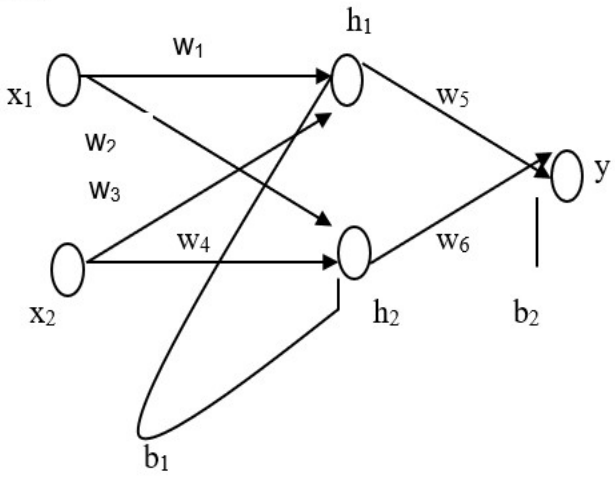
| | | | |
|---|---|---|---|
| 29 | Probabilistic reasoning and uncertainty | TEXT BOOK | |
| **Question : 3** | Illustrate the forms of learning that can solve complex problems where the next state is not predictable? | | |
| 27 | Forms of Learning | TEXT BOOKC | |
| **6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.** | | | CO 6 |
| **Question : 4** | There are five different neurons in the following Multilayer Architecture. The input signals of neurons are x1, x2 and synaptic weights are w1, w2, w3, w4, w5, w6 respectively, bias b1 and b2 are initialized with the following values. Compute the output of two hidden neurons h1, h2 and one output neuron y using a forward pass/function signal. Apply activation function on each layer of output neurons. | | |
| 38 | ANN | TEXT BOOK | |
| **Question : 5** | Develop a neural network application to predict the weather? Also, write the number of neurons used in each layer. | | |
| 36 | ANN | TEXT BOOK | |
| **Question : 6** | Draw a decision tree for the problem of deciding whether or not to move forward at a road intersection is given that the light has just turned green. | | |
| 31 | Learning | TEXT BOOK | |
| **Upload Scanned Document In Case of Numerical or Diagram For Any of The Above Questions.** *(Mention question number with relevant fig / numerical / equations. Max 150 KB)* | | https://form.123formbuilder.com/upload_dld.php?fileid=2113e456133cbc296619112c90c078fd | |
| **I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.** | | | |

PART C, Q.4




Where,
$x_1 = 0.2$, $x_2 = -3$
$w_1 = -1.0$, $w_2 = 2$
$w_3 = -2$, $w_4 = -0.5$
$w_5 = -4.2$, $w_6 = 3$
$b_1 = b_2 = -1.5$