



Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 71 /

**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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**NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA**(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**

<b>Type of Exam</b>	Mid Term 1	<b>Date of Submission</b>	16/02/2021
<b>Name of Faculty</b>	Mr. Rahul Dev Bairwan	<b>Date Examination</b> of	17/02/2021
<b>Course</b>	B.Tech (Aeronautical Engineering)	<b>Semester</b>	SEMESTER : 8
<b>Batch</b>	Combined Batches 12, 13, 14	<b>Subject</b>	8 ME6 - 60.1 Operations Research (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)

<b>Course Outcome</b>	CO1: Make use of Operations Research ideas to solve the practical problems in the society. CO2: Identify the mathematical model of real time problem for optimization, using Linear programming.		
<b>Email I'd</b>	rahuldevbairwan@soaneemrana.org	<b>Phone No.</b>	945-634-1170
<b>Student Name</b>		<b>Student Reg No.</b>	

**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 1

**Question : 1**

Write the definition of operation research.



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

1	Introduction to Operations Research	Operations Research, Gupta and Heera,	
<b>Question : 2</b>	Define constraints.		
2	Introduction to Operations Research	Operations Research, Gupta and Heera,	
<b>Question : 3</b>	Define deterministic nature.		
3	Introduction to Operations Research	Operations Research, Gupta and Heera,	
<b>Question : 4</b>			
<b>Question : 5</b>			
<b>2. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.</b>			CO 2
<b>Question : 6</b>	Define a Linear programming problem.		
3	Linear programming problem	Operations Research, Gupta and Heera,	
<b>Question : 7</b>	Define feasible solution.		
4	Linear programming problem	Operations Research, Gupta and Heera,	
<b>Question : 8</b>	Define key variables.		
4	Linear programming problem	Operations Research, Gupta and Heera,	
<b>Question : 9</b>			
<b>Question : 10</b>			

**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).



## Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 71 /

**NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA****3. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.**

CO 1

**Question : 1** Define the objectives of operations research.

1 Introduction to Operations Research Operations Research, Gupta and Heera,

**Question : 2** Define the scope of operations research.

1 Introduction to Operations Research Operations Research, Gupta and Heera,

**Question : 3** Classify operations research based on the design of model.

2 Introduction to Operations Research Operations Research, Gupta and Heera,

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

CO 2

**Question : 4** Explain the steps in formulation of linear programming model.

3 Linear programming problem Operations Research, Gupta and Heera,

**Question : 5** Write the steps for solving LPP through Graphical Method.

4 Linear programming problem Operations Research, Gupta and Heera,

**Question : 6** Write the algorithm involved in Simplex method of solving an LPP.

5 Linear programming problem Operations Research, Gupta and Heera,

**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 1

**Question : 1** Discuss the main characteristics of OR. Explain with suitable examples.



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

2	Introduction to Operations Research	Operations Research, Gupta and Heera,	
<b>Question : 2</b>	Discuss the history and development of OR.		
1	Introduction to Operations Research	Operations Research, Gupta and Heera,	
<b>Question : 3</b>	Explain the limitations of OR.		
2	Introduction to Operations Research	Operations Research, Gupta and Heera,	
<b>6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.</b>			CO 2
<b>Question : 4</b>	A factory manufactures two products A and B. To manufacture one unit of A, 1.5 machine hours and 2.5 labour hours are required. To manufacture product B, 2.5 machine hours and 1.5 labour hours are required. In a month, 300 machine hours and 240 labour hours are available. Profit per unit for A is Rs. 50 and for B is Rs. 40. Formulate as LPP.		
3	Linear programming problem	Operations Research, Gupta and Heera,	
<b>Question : 5</b>	Solve the following LPP using graphical method  Maximize $Z = 2x_1 + 5x_2$  subject to the conditions $x_1 + 4x_2 \leq 24$ $3x_1 + x_2 \leq 21$ $x_1 + x_2 \leq 9$ and $x_1, x_2 \geq 0$		
4	Linear programming problem	Operations Research, Gupta and Heera,	
<b>Question : 6</b>	Solve it using simplex method. Maximize: $Z = 12x_1 + 3x_2 + x_3$  Subject to: $10x_1 + 2x_2 + x_3 \leq 100$ $7x_1 + 3x_2 + 2x_3 \leq 77$ $2x_1 + 4x_2 + x_3 \leq 80$ $x_1, x_2, x_3 \geq 0$		
5	Linear programming problem	Operations Research, Gupta and Heera,	
<b>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)</b>			
<b>I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.</b>			

