



Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 118 / SET 1

**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**

Type of Exam	Mid Term 1	Date of Submission	25/06/2021
Name of Faculty	Mr. Manbir Singh	Date of Examination	30/06/2021
Course	B.Tech (Mechatronics Engineering)	Semester	SEMESTER : 4
Batch	Fifth (5)	Subject	4 MH4 - 06 Dynamics of Machinery (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	1. To analyze the student with fundamental knowledge of dynamics of machines so that student can appreciate problems of dynamic force balance, transmissibility of forces, and isolation of systems.  2. To Develop knowledge of analysis of rotary and reciprocating engine.		
Email I'd	manbirsingh@soaneemrana.org	Phone No.	807-648-5892
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 1

Question : 1

Define the force and system of forces.



## Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 118 / SET 1

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

1	Dynamic force analysis.	Theory of machine by R.S. Khurmi.	
<b>Question : 2</b>	Explain the Rigid Body dynamics.		
2	Force analysis.	Theory of machine by R.S. Khurmi.	
<b>Question : 3</b>	Explain the inertia force.		
3		Theory of machine by R.S. Khurmi.	
<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>	Explain the difference between static and dynamic analysis.		
2		Theory of machine by R.S. Khurmi.	
<b>Question : 7</b>	Describe the dynamic force analysis necessary.		
3	Dynamic force analysis.	Theory of machine by R.S. Khurmi.	
<b>Question : 8</b>	Describe the equation of motion.		
4	Dynamic force analysis.	Theory of machine by R.S. Khurmi.	
<b>Question : 9</b>			
	Dynamic force analysis.		
<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 / 118 / SET 1

**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**

Explain The principle of superposition in dynamic analysis.

4

Dynamic force analysis.

Theory of machine by  
R.S. Khurmi.**Question : 2**

Define the Motion Analysis of a Slider-Crank Mechanism.

5

Dynamic force analysis.

Theory of machine by  
R.S. Khurmi.**Question : 3**

Explain crank shaft torque and its advantages.

2

force analysis.

Theory of machine by  
R.S. Khurmi.**4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.**

CO 2

**Question : 4**

Define and explain the turning moment diagram.

7

Forces in Reciprocating Parts.

Theory of machine by  
R.S. Khurmi.**Question : 5**

Discuss the Dynamic Analysis in Reciprocating Engines.

3

Forces in Reciprocating Parts.

Theory of machine by  
R.S. Khurmi.**Question : 6**

Discuss the method of finding crank effort in a reciprocating single acting, single cylinder petrol engine.

6

Forces in Reciprocating Parts.

Theory of machine by  
R.S. Khurmi.**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**

Explain types of flywheel are there with neat sketch.



## Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 118 / SET 1

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9	Flywheel.	Theory of machine by R.S. Khurmi.	
<b>Question : 2</b>	The mass of flywheel of an engine is 6.5 tonnes and the radius of gyration is 1.8 meters. It is found from the turning moment diagram that the fluctuation of energy is 56 kN-m. If the mean speed of the engine is 120 r.p.m., find the maximum and minimum speeds.		
5	Inertia Torque.	Theory of machine by R.S. Khurmi.	
<b>Question : 3</b>	Describe in detail crankshaft torque with neat sketch.		
7	Forces in Reciprocating Parts.	Theory of machine by R.S. Khurmi.	
<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 connecting rod is suspended from a point 25 mm above the center of small end, and 650 mm above its center of gravity, its mass being 37.5 kg. When permitted to oscillate, the time period is found to be 1.87 seconds. Find the dynamical equivalent system constituted of two masses, one of which is located at the small end center.		
6	Forces in Reciprocating Parts.	Theory of machine by R.S. Khurmi.	
<b>Question : 5</b>	The flywheel of an engine has a radius of gyration is 1 m and mass 2500 kg. The starting torque of engine is 1500 N-m Determine 1. angular acceleration of the flywheel and 2. kinetic energy of the flywheel after 10 s from start.		
9	Flywheel	Theory of machine by R.S. Khurmi.	
<b>Question : 6</b>	Explain the various forces in Reciprocating engine and also define gas forces.		
7	Forces in Reciprocating Parts.	Theory of machine by R.S. Khurmi.	
<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>			
<b>Corporate Office: H 974, Palam Extension, Part: 1, Sector: 7, Dwarka, New Delhi</b>			