

School of Aeronautics (Neemrana)

I-04, RIICO Industrial Area, Neemrana, Dist. Alwar, Rajasthan

Approved by Director General of Civil Aviation, Govt. of India, All India Council for Technical Education
Ministry of HRD, Govt of India & Affiliated to Rajasthan Technical University, Kota & BTU, Bikaner Rajasthan

Question Paper For Internal Assessment Examination (Theory) - Credit 2 / 34

Instructions For Students / Faculty Mid Term I (Total 40 Marks, 1.5 HRS. Syllabus From Beginning Of Session)

- Part A: Total number of questions to be given are four, 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 8 marks.
- Part B: Total number of questions to be given are five, out of which student has to answer any three. They are long answer type (**Not More Than 50 Words For Question Only**), each carrying 6 marks. Total 18 marks.
- Part C: Total number of questions to be given are three, out of which student has to answer any two. They are numerical answer type / fully elaborative type* (**Not More Than 70 Words For Question Only**), each carrying 7 marks. Total 14 marks.

Mid Term II & III (Total 60 Marks, 2 HRS. Syllabus From Beginning Of Session)

- Part A: Total number of questions to be given are ten, 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 20 marks.
- Part B: Total number of questions to be given are six, out of which student has to answer any four. They are long answer type (**Not More Than 50 Words For Question Only**), each carrying 5 marks. Total 20 marks.
- Part C: Total number of questions to be given are three, out of which student has to answer any two. They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question Only**)*, each carrying 10 marks. Total 20 marks.

* **LIST OF ELABORATIVE THEORY QUESTION SUBJECTS:** 1 FY1 - 04 Communication Skills (Cr 2), 1 FY1 - 05 Human Values (Cr 2), 2 FY1 - 04 Communication Skills (Cr 2), 2 FY1 - 05 Human Values (Cr 2), 3 AN1 - 02 Technical Communication (Cr 2), 4 MH1 - 02 Technical Communications (Cr 2), 4 MH1 - 03 Economics and Financial Accounting (Cr 2), 5 AN5 - 12 Aircraft Maintenance Practices (Cr 2), 6 AN3 - 01 Mechanics of Composite Materials (Cr 2), 6 AN5 - 12 Aircraft Rules and Regulation (Cr 2), 6 MH3 - 01 Automobile Engineering (Cr 2).

FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'C' OF QUESTION PAPER.

STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF EXAM, AND MAY LEAVE THE EXAM HALL ON EXPIRY OF ATLEAST OF 1 Hr FROM THE STARTING TIME OF EXAMINATION.

Question Paper & Student Details

Mid Term	Mid Term 3	Date of Submission	27/09/2020
Name of Faculty	Mr. Ashok Bhatia	Date of Examination	28/09/2020
Course	B.Tech (Mechatronics Engineering)	Semester	SEMESTER : 5
Batch	Fourth (4)	Subject	5 MH3 - 01 Design of Machine Elements (Cr 2)


COURSE OUTCOMES FOR REFERENCE TO FRAME QUESTION PAPER

(Faculties are required to mention relevant Course Outcome number against the respective question in QP)

Course Outcome	5MH3 - 01 Design of Machine Elements (credit-2) COURSE OBJECTIVE 1.To understand the concepts of stress analysis, theories of failure and material science to analyze, design and/or select commonly used machine components and their applications in real life. 2.To illustrate to students the variety of mechanical components available and emphasize the need to continue learning. 3.To impart the knowledge of design theory to identify and quantify machine elements in the design of commonly used mechanical systems. COURSE OUTCOME 1. Able to apply the fundamentals of stress analysis, theories of failure and material science in the design of machine components, perform correct analysis while drawing upon various mechanical engineering subject areas. 2. Capable to design and analysis and sizing of shaft, spring, various types of bearings and various types of gear as well. 3. Able to understand the safety measures and other issues like environmental factor while selecting and/or designing mechanical components/systems. 4. Capable to develop new computer-based techniques for the selection, analysis and synthesis of mechanical components/systems.		
Email I'd	ashokbhatia@soaneemrana.org	Phone No.	798-815-8760
Student Name		Student Reg No.	

Part A			
Question : 1	What are the thermal considerations in brake design ?		
Lesson Plan No. - 18	Topic - Brake	Source - Machine Design by Khurmi	CO No. - 2
Question : 2	How does the function of a brake differ from that of a clutch ?		

Lesson Plan No. - 18	Topic - Brake	Source - Machine Design by Khurmi	CO No. - 1
Question : 3	Establish a formula for the frictional torque transmitted by a cone clutch.		
Lesson Plan No. - 21	Topic - Clutch	Source - Machine Design by Khurmi	CO No. - 2
Question : 4	What is a clutch? Discuss the various types of clutches giving at least one practical application for each.		
Lesson Plan No. - 22	Topic - Clutch	Source - Machine Design by Khurmi	CO No. - 1
Question : 5	Establish a formula for the frictional torque transmitted by a centrifugal clutch.		
Lesson Plan No. - 23	Topic - Clutch	Source - Machine Design by Khurmi	CO No. - 2
Question : 6	Discuss the different types of brakes giving at-least one practical application for each.		
Lesson Plan No. - 20	Topic - Brakes	Source - Machine Design by Khurmi	CO No. - 2
Question : 7	What are the materials used for brake linings.		
Lesson Plan No. - 19	Topic - Brakes	Source - Machine Design by Khurmi	CO No. - 1
Question : 8	What is meant by hydrodynamic lubrication?		
Lesson Plan No. - 24	Topic - Clutch	Source - Machine Design by Khurmi	CO No. - 3
Question : 9	Explain wedge film and squeeze film journal bearings.		
Lesson Plan No. - 24	Topic - Bearing	Source - Machine Design by Khurmi	CO No. - 2
Question : 10	How do you express the life of a bearing?		
Lesson Plan No. - 24	Topic - Bearing	Source - Machine Design by Khurmi	CO No. - 3
Part B			
Question : 1	Name the different types of clutches. Describe with the help of neat sketches the working principles of two different types of friction clutches.		
Lesson Plan No. - 21	Topic - Clutch	Source - Machine Design by Khurmi	CO No. - 3
Question : 2	What is a self-energizing brake ? When a brake becomes self-locking.		
Lesson Plan No. - 19	Topic - Brakes	Source - Machine Design by Khurmi	CO No. - 4
Question : 3	What is the procedure followed in designing a journal bearing?		
Lesson Plan No. - 24	Topic - Bearing	Source - Machine Design by Khurmi	CO No. - 1
Question : 4	What are rolling contact bearings? Discuss their advantages over sliding contact bearings.		
Lesson Plan No. - 25	Topic - Bearings	Source - Machine Design by Khurmi	CO No. - 3
Question : 5	Where are the angular contact and self-aligning ball bearings used? Draw neat sketches of these bearings.		
Lesson Plan No. - 25	Topic - bearings	Source - Machine Design by Khurmi	CO No. - 1
Question : 6	Derive an expression for reliability of rolling contact bearing.		
Lesson Plan No. - 25	Topic - bearing	Source - Machine Design by Khurmi	CO No. - 3
Part C			
Question : 1	Select a single row deep groove ball bearing for a radial load of 4000 N and an axial load of 5000 N, operating at a speed of 1600 r.p.m. for an average life of 5 years at 10 hours per day. Assume uniform and steady load.		
Lesson Plan No. - 25	Topic - bearing	Source - Machine Design by Khurmi	CO No. - 4
Question : 2	A 150 mm diameter shaft supporting a load of 10 kN has a speed of 1500 r.p.m. The shaft runs in a bearing whose length is 1.5 times the shaft diameter. If the diametral clearance of the bearing is 0.15 mm and the absolute viscosity of the oil at the operating temperature is 0.011 kg/m-s, find the power wasted in friction		

Lesson Plan No. - 24	Topic - beaing	Source - Machine Design by Khurmi	CO No. - 4
Question : 3	Refer Word File		
Lesson Plan No. - 19	Topic - brakes	Source - Machine Design by Khurmi	CO No. - 3
Upload Scanned Document In Case of Numerical or Diagram For Any of The Above Questions. <i>(Mention question number with relevant fig / numerical / equations. Max 150 KB)</i>			
I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.			

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