

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 3 / 54 /

Instructions For Students / Faculty Mid Term I (Total 60 Marks, 2 HRS. Syllabus From Beginning Of Session)

• Part A: Total number of questions to be given are five, 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 15 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**), each carrying 6 marks. Total 24 marks.

• Part C: Total number of questions to be given are four, out of which student has to answer any three. They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question**)*, each carrying 7 marks. Total 21 marks.

Mid Term II & III (Total 90 Marks, 2.5 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 seven, out of which student has to answer any five. They are long answer type (**Not More Than 50 Words For Question**), each carrying 6 marks. Total 30 marks.

• Part C: Total number of questions to be given are five, out of which student has to answer any four. They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question**)*, each carrying 10 marks. Total 40 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 (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)

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

Question Paper & Student Details

Mid Term	Mid Term 3	Date of Submission	25/09/2020
Name of Faculty	Mr. Rahul Dev Bairwan	Date of Examination	03/10/2020
Course	B.Tech (Aeronautical Engineering)	Semester	SEMESTER : 3
Batch	Combined Batches 18, 19, SF 2	Subject	3 AN4 - 06 Mechanics of Solids (Cr 3)

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	3AN4-06: Mechanics of Solids (Credit-3) COURSE OBJECTIVE 1. To learn about the basic properties, behavior and response of materials. 2. To allow the student to carry out easy and moderate level structural analysis of basic structural members. 3. To enable the student to gain knowledge in how stresses are developed and distributed internally in beams. 4. To familiarize with the different methods used for beam deflection analysis. 5. To impart knowledge to the students on Buckling of columns 6. To acquire knowledge on how structural elements are sized. COURSE OUTCOME Upon completion of the course, Students will be able to CO1: Apply materials and their elastic constants for composite bar subjected to various loads including thermal load. CO2: Solve the problems on structural members subjected to Uni-axial load. CO3: Construct Shear Force, Bending moment and Bending stress distribution in beams subjected to transverse load. CO4: Determine the deflection of statically determinant beam. CO5: Design Columns with different end conditions. CO6: Analyze the problems on torsion Circular Shafts.
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Student Name		Student Reg No.	
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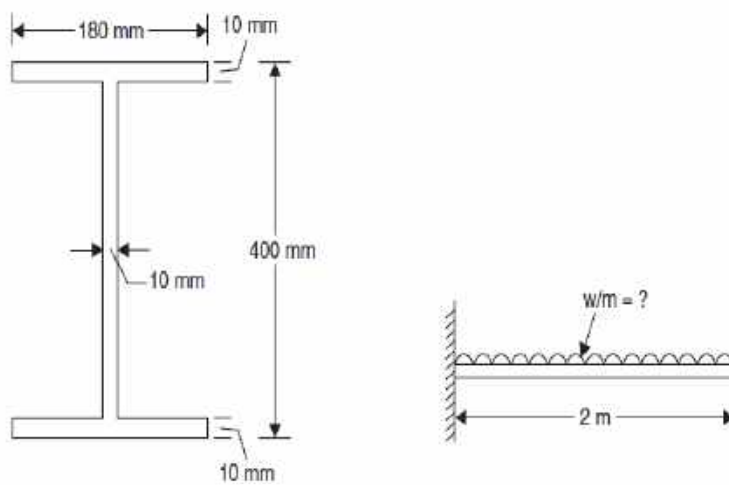
Part A			
Question : 1	Define Elasticity.		
2	Stress and Strain	S S Bhavikatti	1
Question : 2	Define Young's modulus.		
2	Stress and Strain	S S Bhavikatti	1
Question : 3	Define principal plane and principal stress.		
11	Principal Stress and Strain	S S Bhavikatti	2
Question : 4	Define pure bending.		
19	Bending in Beams	S S Bhavikatti	3
Question : 5	What do you mean by point of contra-flexure?		
24	Bending in Beams	S S Bhavikatti	3
Question : 6	Define factor of safety.		
6	Stress and Strain	S S Bhavikatti	1
Question : 7	Define buckling load.		
35	Column and Strut	S S Bhavikatti	5
Question : 8	What is slenderness ratio?		
35	Column and Strut	S S Bhavikatti	5
Question : 9	Define Torsion.		
32	Torsion of Shafts	S S Bhavikatti	6
Question : 10	What is Polar moment of inertia?		
32	Torsion of Shafts	S S Bhavikatti	6
Part B			
Question : 1	Derive an expression between modulus of elasticity and modulus of rigidity.		
6	Stress and Strain	S S Bhavikatti	1
Question : 2	Specimen of steel 20 mm diameter with a length of 200 mm is tested to destruction. It has an extension of 0.25 mm under a load of 80 kN and the load at elastic limit is 102 kN. The maximum load is 130 kN. Extension at fracture is 56 mm and diameter at neck is 15 mm. Find stress at elastic limit, Young's modulus, Percentage elongation, Percentage reduction in area.		
5	Stress and Strain	S S Bhavikatti	2
Question : 3	Explain beams and different types of loads on beam.		
17	Bending in Beams	S S Bhavikatti	3
Question : 4	A simply supported beam of span L is carrying a uniformly distributed load W over its entire span. Calculate S.F & B.M. Also draw shear force and bending moment diagram.		
19	Bending in Beams	S S Bhavikatti	3
Question : 5	Derive the Euler's formula for buckling load in long columns.		
36	Column and Strut	S S Bhavikatti	5
Question : 6	Derive the relation for circular shaft when subjected to torsion.		
32	Torsion of Shafts	S S Bhavikatti	6

Question : 7	Derive the differential equation for deflection of beams.		
26	Deflection of beams	S S Bhavikatti	4
Part C			
Question : 1	Derive the bending equation with assumptions.		
18	Bending in Beams	S S Bhavikatti	3
Question : 2	Figure shows the cross-section of a cantilever beam of 2.5 m span. Material used is steel for which maximum permissible stress is 150 N/mm ² . What is the maximum uniformly distributed load this beam can carry?		
23	Bending in Beams	S S Bhavikatti	3
Question : 3	A simply supported beam AB length 6m with a point load of 30 kN is applied at a distance 4m from left end A shown in fig. Determine the equations of the elastic curve between each change of load point and the maximum deflection of the beam.		
30	Deflection of beams	S S Bhavikatti	4
Question : 4	Draw the shear stress variation diagram for the I-section shown in Fig. If it is subjected to a shear force of 100 kN.		
26	Bending in Beams	S S Bhavikatti	3
Question : 5	The diameter of a shaft to transmit 25 kW at 1500 rpm, given that the ultimate strength is 150 MPa and the factor of safety is 3, will nearly be?		
37	Torsion of Shafts	S S Bhavikatti	6
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://www.123formbuilder.com/upload_dld.php?fileid=ed264f87d1407c6d6379e67767b5d60b	
I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.			

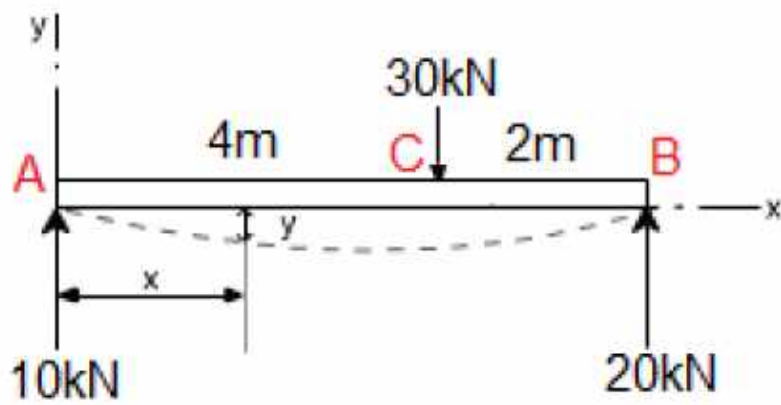
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PART C

2.



3.



4.

