



Question Paper For Internal Assessment Examination (Theory) - Credit 4 / 27 /

Instructions for Students/Faculty Mid Term I (Total 80 Marks, 2 HRS. Syllabus from Unit-1)

- Part A: Total number of questions to be given are ten (5 from CO1 and 5 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 20 marks.
- 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). They are long answer type (**Not More Than 50 Words for Question**), each carrying 5 marks. Total 20 marks.
- 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). They are numerical answer type / fully elaborative type (**Not More Than 70 Words for Question**) *, each carrying 10 marks. Total 40 marks.

Mid Term II (Total 120 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 4 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 40 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 7 marks. Total 28 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 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 13 marks. Total 52 marks.

Mid Term III (Total 120 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 4 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 40 marks.
- Part B: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student must answer four (2 from CO5 and 2 from CO6). They are long answer type (**Not More Than 50 Words for Question**), each carrying 7 marks. Total 28 marks.
- Part C: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student must 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 13 marks. Total 52 marks.

* **LIST OF ELABORATIVE THEORY QUESTION SUBJECTS: NO SUBJECT UNDER CREDIT FOUR**

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, AND MAY LEAVE THE EXAM HALL ON EXPIRY OF ATLEAST OF 1 Hr FROM THE STARTING TIME OF EXAMINATION.**

QUESTION PAPER AND STUDENTS DETAILS

Type of Exam	Mid Term 2	Date of Submission	01/02/2021
Name of Faculty	Mr. Sidhartha Sondh	Date of Examination	04/02/2021
Course	B.Tech (Aeronautical Engineering)	Semester	SEMESTER : 3
Batch	Combined Batches 18, 19, SF 2	Subject	3 AN4 - 04 Incompressible Fluid Mechanics (Cr 4)

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	CO3: Demonstrate conservation laws to determine velocities, pressures, and accelerations for incompressible and inviscid fluids. CO4: Analyse the relationship between shear stress and pressure gradient for different conditions.		
Email I'd	sidharthasondh@soaneemrana.org	Phone No.	963-455-7511
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.	3		
Question : 1	Define flow visualization.		
17	Flow visualization	Self	
Question : 2	Describe briefly about orifice meter.		
18	Orifice meter	Self	
Question : 3	Define vena contracta.		
19	Venturi meter	Self	
Question : 4	Describe convective acceleration.		
17	Acceleration	Self	

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Question : 5	What is circulation?		
19	Circulation	Self	
2. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			4
Question : 6	Give applications of Navier Stokes equation.		
21	Navier Stokes equation	Self	
Question : 7	Define fully developed flow.		
25	Flow	Self	
Question : 8	Give the significance of Hagen Poiseuille equation.		
23	Hagen Poiseuille equation	Self	
Question : 9	Define transition flow.		
25	Flow	Self	
Question : 10	Define shear stress.		
27	Shear stress	Self	
Part B			
<p>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).</p> <p>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).</p> <p>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).</p>			
3. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			3
Question : 1	With the help of neat diagram explain: 1. Bernoulli's Equation 2. Meta-center and Metacentric Height 3. Rotational and Vorticity		
18	Fundamentals	Self	
Question : 2	Derive Momentum conservation equation. Justify, what is the need of considering control volume for this.		
20	Momentum conservation equation	Self	
Question : 3	Derive the expression of discharge for venturimeter.		
19	Venturimeter	Self	
4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			4



Question : 4	Identify the significance of Navier Stokes equation in Fluid Mechanics.		
23	Navier Stokes equation	Self	
Question : 5	Derive expression for Bernoulli's equation. Also state the assumptions made.		
21	Bernoulli's equation	Self	
Question : 6	Derive the Chezy's formula for loss of head due to friction.		
26	Chezy's formula	Self	
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.	3
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Question : 1	A pitot-static tube is used to measure the velocity of the watering pipe. The stagnation pressure head is 6mm and the static pressure head is 5m. Calculate the velocity of flow assuming the co-efficient of the tube equal to 0.98		
19	Pitot tube	Fluid Mechanics and Machinery By R k Rajput	
Question : 2	Air enters a nozzle steadily at 2.21 kg/m ³ and 30 m/s and leaves at 0.762 kg/m ³ and 180 m/s. If the inlet area of the nozzle is 80 cm ² , determine (a) the mass flow rate through the nozzle, and (b) the exit area of the nozzle.		
24	Continuity equation	Fluid Mechanics and Machinery By R k Rajput	
Question : 3	A venturimeter with a throat diameter of 7.5 cm is installed in a 15 cm diameter pipe. The pressure at the entrance is 70kPa (Gauge) and it is desired that the pressure at any point should not fall below 2.5 m of absolute. Determine the maximum flow rate of water through the meter. Take Cd = 0.97 and atmospheric pressure as 100 kPa.		
21	Venturimeter	Fluid Mechanics and Machinery By R k Rajput	

6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.	4
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Question : 4	The rate of flow of water through a horizontal pipe is 0.25 m ³ /s. The diameter of the pipe which is 200 mm is suddenly enlarged to 400 mm. The pressure intensity in the smaller pipe is 11.772 N/cm ² . Determine: (i) loss pf head due to enlargement (ii) pressure intensity in the large pipe, (ii) power lost due to enlargement		
25	Frictional loss	Fluid Mechanics and Machinery By R k Rajput	
Question : 5	A 250mm dia pipe Carrie oil of specific gravity 0.9 at a velocity of 3m/s. At another section the dia is 200mm. Find the velocity of the cross-section and the mass rate of flow of oil.		
25	Viscous flow	Fluid Mechanics and Machinery By R k Rajput	
Question : 6	Derive the expression for Hagen Poiseulli equation.		
27	Hagen Poiseulli equation	Self	
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)			
I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.			
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