Question Paper For Internal Assessment Examination (Theory) - Credit 4 / 24 /

Instructions for Students/FacultyMid 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 1	**Date of Submission**	09/01/2021
Name of Faculty	Mr. Sidhartha Sondh	**Date of Examination**	12/01/2021
Course	B.Tech (Aeronautical Engineering)	**Semester**	SEMESTER : 3
Batch	Eighteenth (18)	**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	CO1: Distinguish different types of fluid, properties and their behavior under various conditions. CO2: Apply scientific method strategies to fluid mechanics: analyse qualitatively and quantitatively the problem situation, propose hypotheses and solutions. 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. CO5: Explain the concepts of viscous boundary layers and Turbulent Flow characteristic. CO6: Illustrate the principles of dimensional analysis to identify non dimensional parameters.		
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.			1
Question : 1	What are non-Newtonian Fluids? Give some examples.		
3	Fluids	Self	
Question : 2	Define capillarity.		
6	Fundamentals	Self	
Question : 3	Mention the characteristics of ideal fluid.		
4	Fluids	Self	

Question : 4	What is cavitation? How is it caused?		
2	Cavitation	Self	
Question : 5	What is statics, dynamics and kinematics?		
1	Fundamentals	Self	
2. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			2
Question : 6	Distinguish between static and stagnation pressure		
8	Pressure	Self	
Question : 7	Is the Lagrangian method of fluid flow analysis more similar to study of a system or a control volume? Explain.		
10	Lagrangian method	Self	
Question : 8	What is stream line? How do streak-lines differ from path lines?		
9	Stream lines	Self	
Question : 9	A ship made of iron floats while an iron needle sinks. Justify the statement.		
7	Floating body	Self	
Question : 10	What is the importance of flow visualization in Fluid mechanics field?		
11	Flow visualization	Self	

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).

3. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			1
Question : 1	State and prove Pascal's law.		
6	Pascal law	Self	
Question : 2	Write a short not on: i. Specific gravity ii. Shear thickening fluid iii. Surface tension		
3	Fundamentals	Self	
Question : 3	Explain the concept of continuum. What is its significance?		
4	Fundamentals	Self	

4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			2
Question : 4	Explain the condition of equilibrium for floating bodies. Draw neat diagram to support your answer.		
9	Flotation	Self	
Question : 5	Explain the relation between circulation and vorticity.		
11	Circulation	Self	
Question : 6	What is streamlining of a body? What is its significance in engineering?		
10	Stramline	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.			1
Question : 1	A 150 mm diameter shaft rotates at 1500 rpm in a 200 mm long journal bearing with 150.5 mm internal diameter. The uniform annular space between the shaft and the bearing is filled with oil of dynamic viscosity 0.8 poise. Calculate the power dissipated as heat.		
3	Viscisity	Fluid Mechanics By R K Bansal	
Question : 2	What do you mean by surface tension? If the pressure difference between the inside and outside of the air bubble of diameter 0.01 mm is 29.2 kPa, what will be the surface tension at air-water interface?		
5	Surface tension	Fluid Mechanics By R K Bansal	
Question : 3	Calculate the capillarity effect in millimeters in a glass tube of 4mm diameter; when immersed in (i) water, (ii) mercury. The value of surface tension of water and mercury in contact with air are 0.0735 N/m and 0.51 N/m respectively. Assume the suitable value of angle of contact for both the case, and take specific weight of water as equal to 9790 N/m3.		
6	Capillarity	Fluid Mechanics By R K Bansal	
6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			2

Question : 4	A rectangular block 10 m long, 7 m broad, and 2.5 m deep weighs 700kN. It carries on its upper surface an empty boiler of 5 m diameter weighing 600 kN. The center of gravity of the boiler and block are at their respective centers along a vertical line. Find the metacentric height. Weight density of sea water is 10.104 kN/m3.		
13	Metancentric height	Fluid Mechanics By R K Bansal	
Question : 5	An inverted differential manometer containing an oil of specific gravity 0.9 is connected to find the difference of pressure at two points of a pipe containing water. If the manometer reading is 40 cm, find the difference of pressures.		
7	Manometers	Fluid Mechanics By R K Bansal	
Question : 6	Consider the steady, incompressible, two-dimensional velocity field: V= (u,v)=(0.5+0.8x)i+(1.5-0.8y)j Calculate Local, convective and total acceleration at the point (x = 3 m, y = 2 m).		
9	Velocity	Fluid Mechanics By R K Bansal	
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.			