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 4 / 8 / SET 1

Question Paper For Internal Assessment Examination (Theory) - Credit 4
• **Instructions For Students / FacultyMid Term I (Total 80 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)**, 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 12 marks. Total 36 marks.**Mid Term II & III (Total 120 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 8 marks. Total 40 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 15 marks. Total 60 marks.
* LIST OF ELABORATIVE THEORY QUESTION SUBJECTS: NO SUBJECT UNDER CREDIT FOUR
FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICALELABORATIVE 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**	25/09/2020
Name of Faculty	Mr. Sidhartha Sondh	**Date of Examination**	01/10/2020
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	COURSE OUTCOME Upon completion of the course, Students will be able to 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
Student Name	

Email I'd	sidharthasondh@soaneemrana.org	**Phone No.**	963-455-7511
Student Name		**Student Reg No.**	

Part A			
Question : 1	Define Mach number.		
36	Dimensionless number	Self	6
Question : 2	What is flow visualization?		
16	Flow visualization	Self	3

Question : 3	Define momentum thickness.		
28	Momentum thickness	Self	5
Question : 4	Differentiate between vacuum and gauge pressure.		
8	Pressure	Self	2
Question : 5	What is the application of pitot tube?		
19	Pitot tube	Self	2
Question : 6	Give the necessary assumptions to derive Bernoulli's equation.		
26	Bernoulli's equation	Self	3
Question : 7	Define Bluff body.		
38	Bluff body	Self	6
Question : 8	Differentiate between Fundamental and Derived units.		
35	Units	Self	6
Question : 9	Give applications of Navier Stokes equation.		
19	Navier Stokes equation	Self	4
Question : 10	Define specific gravity.		
3	Fundamentals	Self	1
Part B			
Question : 1	Explain the phenomenon of Boundary layer separation with a neat diagram.		
34	Boundary layer	Self	6
Question : 2	Give the significance of following: i. Webber number ii. Streamlines iii. Centre of Buoyancy		
31	Fundamentals	Self	6
Question : 3	Write short note on: i. Euler model ii. Streamlined body iii. Venturimeter.		
32	Fundamentals	Self	5
Question : 4	Derive expression for Darcy Weisbach equation.		
30	Darcy Weisbach equation	Self	5
Question : 5	Explain the condition of equilibrium for a floating body.		
16	Equilibrium	Self	3
Question : 6	Derive three dimensional momentum conservation equation.		
24	Conservation equation	Self	4
Question : 7	Explain the concept of flow visualization. How can you visualize the flow?		
17	Flow viualization	Self	3
Part C			

Question : 1	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.		
14	Metacentre	Fluid Mechanics By R K Bansal	3
Question : 2	Considering an example, explain the important steps for performing dimensional analysis by Buckingham Pi method.		
32	Dimensional analysis	Self	6
Question : 3	A 1:15 model of a flying boat is towed through water. The prototype is moving in sea-water of density 1024 kg/m3 at a velocity of 20 m/sec. Find the corresponding speed of the model. Also determine the resistance due to waves on model if the resistance due to waves of prototype is 600 N.		
38	Models	Fluid Mechanics By R K Bansal	6
Question : 4	In a 100 mm diameter horizontal pipe a venturimeter of 0.5 contraction ratio has been fixed. The head of water on the meter when there is no flow is 3m (gauge). Find the rate of flow for which the throat pressure will be 2 meters of water absolute. The co-efficient of meter is 0.97. Take atmospheric pressure head = 10.3 m of water.		
18	Venturimeter	Fluid Mechanics By R K Bansal	3
Question : 5	Three pipes of 400mm, 200mm and 300mm, diameters have lengths of 400m, 200m ,300m respectively. They are connected in series to make compound pipe. The ends of this compound pipe are connected with two tanks whose difference of water is 16m. If coefficient of fiction for these pipes is same and equal to 0.05, determine discharge through the compound pipe neglecting first the minor losses and then including them.		
31	Flow through pipes	Fluid Mechanics By R K Bansal	5
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.	S 5		

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