BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MTECH/MSC   SEMESTER : II
BRANCH: SER/MATHS   SESSION : SP/19

SUBJECT: SR579 EXPERIMENTAL AERODYNAMICS

TIME: 3.00 Hrs.   FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a)   Sketch an indraft supersonic wind tunnel using the components which are essentially required and briefly discuss them.   [7]

Q.1(b)   Differentiate between supersonic wind tunnel operated under constant dynamic pressure and constant mass flow.   [3]

Q.2(a)   Describe the difference between the Lagrangian and Eulerian description of flow and give flow visualization examples for each.   [5]

Q.2(b)   Illustrate the various flow field visualization techniques used in practice. Are these method capable of featuring flow separation and transition?   [5]

Q.3(a)   Discuss the working of an electronic pressure scanner? How does it differ from the mechanical pressure measurement system?   [5]

Q.3(b)   Compare the basic principle of shadowgraph and a schlieren system of making flow visualization.   [5]

Q.4(a)   Illustrate the directional response of hot wire probes. State also the significance of Jorgensen Law in such response.   [5]

Q.4(b)   Categorize giving examples the different types of data which represents the physical phenomenon.   [5]

Q.5(a)   Describe speed, reliability, repeatability, accuracy and resolution of an ADC card. Define also the "sampling" and hence infer about aliasing of a data.   [5]

Q.5(b)   Find out the resolution of a 16bit ADC card with a signal input range of 0-10 v. The DAQ board has an amplification factor of 100.   [2.5]

Q.5.(c)   Describe the difference between random and systematic error.   [2.5]

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