



**NAVVRACHANA
UNIVERSITY**
a UGC recognized University

School: School of Engineering and Technology
Program/s: B.Tech Mechanical
Year: 2nd **Semester:** 4th
Examination: Mid Examination
Examination year: May – 2023

Course Code: ME 215 **Course Name:** Fluid Mechanics II
Date: 17/05/2023
Time: 10:00 am to 12:00 pm

Total Marks: 40
Total Pages: 01

Instructions:

- Write each answer on a new page.
- Assume the data when required.
- Use of calculator is allowed.

Q. No.1	Answer all the questions (Each of 05 marks)		COs*	BTL*
Q.1	A. What is Mach Number? Discuss in detail with schematics the propagation of pressure waves for subsonic, sonic and supersonic speed of the object. B. Derive Energy Equations for Isothermal process and Adiabatic process.	14	CO1 CO2	BT1, BT2
Q.2	Define area ratio and derive the expression for determining the area ratio for the nozzles. Also discuss the effect of various parameters on area ratio of nozzle. OR What constitute over expanded and under expanded nozzles. Sketch and explain flow separation in these nozzles.	10	CO1 CO2	BT 1, BT 2
Q.3	A. Define Velocity of Approach and write the expression for the same. Derive the expression for determining the error in discharge due to error in measurement of head over a rectangular and triangular notch. B. Find the discharge over a stepped rectangular notch as shown in figure 01. Consider coefficient of discharge as 0.65, 0.62 and 0.67 for respective sections	04 02	CO3 CP4 CO3 CP4	BT 4, BT6, BT 2 BT 4

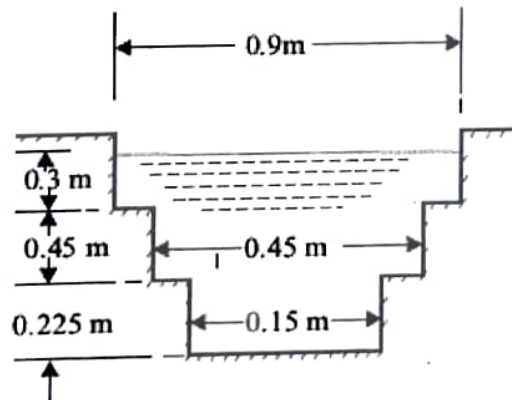


Figure 01

Q.4	A. Water flows through a pipeline whose diameter varies from 25 cm to 15 cm over a length of 10 m. If the Darcy – Weisbach friction factor is assumed constant at 0.018 for the whole length of pipe then determine the head loss in friction when the pipe is flowing full with a discharge of $0.06 \text{ m}^3/\text{s}$.	04	CO3 CP4	BT 1, BT.
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*****End of Question Paper*****