

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

**B.TECH. DEGREE III SEMESTER REGULAR EXAMINATION IN
MARINE ENGINEERING DECEMBER 2020**

19-208-0305 FLUID MECHANICS
(2019 Scheme)

Time: 30 Minutes [for Answering and Scanning/Uploading the page of the Answer Sheet]

Max. Marks: 8

INSTRUCTIONS

1. You have to be available in Google Meet Video Camera throughout the examination hours.
2. Those students who are not present through Google Meet Video Camera will not be permitted to write the online examination.
3. You have to share your '**live location**' to the faculty before uploading the answer sheet.
4. You have to answer only one question.
5. You have to write Register Number, Subject code and Module/Group Number (as given in the Question Paper) in each page.
6. Answer may not exceed one page of an A4 size paper in a standard handwriting, as far as possible.
7. If at all an answer goes beyond one page, (due to your handwriting) another page can also be used. In such a situation, the page number should be given as 1/2, 2/2.
8. You have to put the Question Number correctly.
9. After answering the question, you have to scan in pdf format and upload the answer page in a format of <reg. no.><module/group no.><question no.>.pdf.

MODULE - I

(Answer **ANY ONE** question)

- I(1). A 5 cm diameter and 40 cm long solid cylinder was made of two different materials. The first part is made of a material of specific gravity 5.0 and 1 cm long from base. The other part is made of material having specific gravity 0.5. State whether it can float vertically in water keeping circular face parallel to water surface. (8)
- OR**
- I(2). With the help of a sketch, derive the equation of centre of pressure of an inclined plate surface submerged in liquid. (8)

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MODULE - II

(Answer **ANY ONE** question)

II(1). Calculate the convective acceleration at the middle of a pipe which converges uniformly from 0.6m to 0.2 m diameter over 1 m length. The rate of flow is 20 lit/s. (8)

OR

II(2). Define and explain the experimental determination of hydraulic coefficients. (8)

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MODULE - III

(Answer *ANY ONE* question)

III(1). Two reservoirs with difference of 30 m water level are connected by 600 mm diameter and 5000 m length pipe line. At a distance of 1000 m from the upper reservoir, a small pipe is connected to the pipe line. The water can be taken from the small pipe. Find the discharge to the lower reservoir, if 50 l/s of water is taken from the small pipe. (Take $f = 0.005$ and neglect minor losses) (8)

OR

III(2). Derive Darcy - Weisbach formula and Chezy's formula for loss of head due to pipe friction (8)

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MODULE - IV

(Answer **ANY ONE** question)

IV(1). Explain with the help of figure any 3 experimental methods of determining the coefficient of viscosity of a liquid. (7)

OR

IV(2). Explain with the help of derivation, the velocity distribution and shear stress distribution across a flow of viscous fluid between two parallel plate (7)

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MODULE - V

(Answer **ANY ONE** question)

- V(1). A cylinder, whose axis is perpendicular to the stream of air having a velocity of 19 m /s, rotates at 350 r.p.m. The cylinder is 2 m in diameter and 10 m long. Find the circulation, theoretical lift force per unit length, the position of stagnation points and the actual drag and lift , take $C_L = 3.3$, $C_D = 0.65$ and $\frac{u\phi}{U} = 1.57$. Density of air is 1.2 kg/m^3 . (7)

OR

- V(2). A 12 cm diameter and 32 cm deep open cylindrical vessel is filled with water up to the top. If it is rotating about its vertical axis with a speed of 500 r.p.m., Find the quantity of liquid left in the vessel. (7)
