Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May– 2017**

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| **Code :** | **14CE2003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MECHANICS OF FLUIDS** | **Max. Marks:** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | An oil of viscosity 5 poise is used for lubrication between a shaft and sleeve. The diameter of the shaft is 0.5 m and it rotates at 200 rpm. Calculate the power loss in oil for a sleeve length of 100 mm. The thickness of oil film is 1 mm. | CO1 | 20 |
| (OR) | | | | |
| 2 |  | Estimate the dynamic viscosity of an oil, which is used for lubrication between the square plate of size 0.8 × 0.8 m and an inclined plane with angle of inclination 30° as shown in figure. The weight of the square plate is 300 N, and it slides down the inclined plane with a uniform velocity of 0.3 m/s. The thickness of oil film is 1.5 mm. | CO1 | 20 |
| 3. | a. | A simple U-tube manometer containing mercury is connected to pipe through which a fluid of specific gravity 0.8 is flowing. Estimate the vacuum pressure inside pipe, if difference in mercury level between limbs is 40 cm and left limb fluid height is 15 cm. | CO1 | 10 |
|  | b. | The right limb of simple U-tube manometer containing mercury is open to the atmosphere while the left limb is connected to a pipe in which a fluid of specific gravity 0.9 is flowing. The centre of the pipe is 12 cm below the level of mercury in the right limb. Calculate the pressure of fluid in the pipe if the difference of mercury level in the two limbs is 20 cm. | CO1 | 10 |
| (OR) | | | | |
| 4. |  | An inverted differential mercury manometer connected to two pipes carrying water. Manometer reading is shown in figure**.** Evaluate the pressure difference between two pipes. | CO1 | 20 |
| 5. |  | A 30 cm diameter pipe, conveying oil, branches into two pipes of diameter 20 cm and 15 cm respectively. The average velocities in 30 cm diameter and 20 cm diameter sections are 2.5 m/s and 2 m/s, respectively. Estimate the discharge rate in two branches. | CO2 | 20 |
| (OR) | | | | |
| 6. |  | Water is flowing through a taper pipe of length 100 m, having diameters of 60 cm and 30 cm at the upper and lower ends, respectively. The pipe has a slope  of 1 in 30 and the rate of flow is 50 L/s. Estimate the pressure at the lower end if the pressure at higher end is 19.62 N/cm2. | CO2 | 20 |
| 7. |  | A horizontal venturimeter with inlet and throat diameter of 20 cm and 10 cm, respectively is used to measure flow of oil of specific gravity 0.8. Estimate the reading of the oil-mercury manometer, if the discharge rate is 60 lit/s. Assume C*d* = 0.98. | CO3 | 20 |
| (OR) | | | | |
| 8. |  | An orifice meter with orifice diameter 15 cm is inserted in a 30 cm diameter pipe carrying oil of specific gravity 0.9. Mercury manometer connected to both ends of orifice meter gives a differential reading of 50 cm. Measure the actual flow rate through the pipe, given *Cd*= 0.64. | CO3 | 20 |
|  |  | **Compulsory:** |  |  |
| 9. |  | A horizontal pipe of diameter 500mm is suddenly contracted to a diameter of 250 mm. Determine the discharge rate through the pipe if pressure intensities in larger and smaller pipes are 13.73 N/cm2 and 11.77 N/cm2, respectively. Given *C*c = 0.62. | CO3 | 20 |

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