

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) EXAMINATION – WINTER 2021****Subject Code:3130502****Date:17-02-2022****Subject Name:Fluid Flow Operations****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

| | | Marks |
|--|---|-----------|
| Q.1 | (a) Define: 1) Ideal fluid 2) Compressible fluid and 3) Incompressible fluid. | 03 |
| | (b) Discuss the concept of hydrostatic equilibrium. | 04 |
| | (c) Explain in detail Newtonian and Non-Newtonian fluids with suitable examples. | 07 |
| Q.2 | (a) Discuss Reynolds number with reference to Reynolds experiment. | 03 |
| | (b) With neat sketch, explain the principle and working of gravity decanter. | 04 |
| | (c) Derive Bernoulli's equation without friction and write the assumptions. | 07 |
| OR | | |
| Q.3 | (c) Explain boundary layer separation and wake formation. | 07 |
| | (a) Define friction and write short note on friction factor chart. | 03 |
| | (b) A crude oil of kinematic viscosity 0.4 stoke is flowing through a pipe of diameter 300 mm at the rate of 300 litres per sec. Find the head lost due to friction for a length of 50 m of the pipe. | 04 |
| (c) Prove that kinetic energy correction factor for laminar flow of newtonian fluids through circular pipe is 2. | 07 | |
| OR | | |
| Q.3 | (a) Discuss the concept of fully developed flow. | 03 |
| | (b) Explain effect of roughness. | 04 |
| | (c) Discuss friction loss in sudden enlargement and sudden contraction in cross sectional area of pipe. | 07 |
| Q.4 | (a) What do you mean by subsonic, sonic and supersonic flows? | 03 |
| | (b) What is kinematic viscosity? Discuss the effect of temperature on viscosity. | 04 |
| | (c) Explain in detail drag and drag coefficient. | 07 |
| OR | | |
| Q.4 | (a) Distinguish between compressor and blower. | 03 |
| | (b) Explain in detail about isentropic flow of compressible fluid. | 04 |
| | (c) List the different dimensional analysis methods applied to fluid flow and explain any one method in detail. | 07 |
| Q.5 | (a) What are the advantages of Centrifugal pump over Reciprocating pump? | 03 |
| | (b) Distinguish between pipes and tubes. | 04 |
| | (c) With neat sketch, explain the principle and working of rotameter. | 07 |
| OR | | |
| Q.5 | (a) Define cavitation. What are some common best practices to prevent cavitation? | 03 |
| | (b) Discuss the working of Gate valve and Globe valve. | 04 |
| | (c) With neat sketch explain principle, construction and working of a centrifugal pump. | 07 |
