KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

POLITEKNIK MALAYSIA
KUCHING SARAWAK

DEPT. OF MECHANICAL ENGINEERING

DJJ20273 / FLUID MECHANICS

LECTURER NAME		
TYPE OF ASSESSMENT		
TOPIC		
DURATION		
DATE OF ASSESSMENT		
STUDENT'S INFORMATION	***NAME***	***REGISTRATION NO.***
TOTAL MARKS	***CLO3***	***/MARKS***

Nota :

i. *Bagi kursus seperti MPU22042 Bahasa Kebangsaan A dan lain-lain kursus yang diajar dalam Bahasa Melayu maka penggunaan bahasa pada muka hadapan lembaran kerja dan arahan/kandungan pada lembaran kerja adalah menggunakan Bahasa Melayu sepenuhnya.*

POLITEKNIK MALAYSIA
KUCHING SARAWAK

DJJ20273 – FLUID MECHANICS

ASSESSMENT NO. 1 & PHYSICAL PROPERTIES OF FLUID

CLO NO.	CLO STATEMENT	PLO NO.	DK DP NA
CLO3	Organize appropriate experiments in groups according to the Standard Operating Procedures.	P4, PLO5	DK6: ENGINEERING PRACTICE DP1: DEPTH OF KNOWLEDGE DP2: RANGE OF CONFLICTING REQUIREMENT DP3: DEPTH OF ANALYSIS REQUIRED

A. OBJECTIVES

To determine mass density, specific weight, specific gravity, and specific volume of a substance.

B. LEARNING OUTCOME

At the end of the lab session students should be able:

i. To define the properties of oil, water, and dishwasher liquid.

ii. To investigate the fluid properties of the mixtures of oil, water, and dishwasher liquid in beaker.

C. TOPIC SUMMARY/ THEORY

Fluid properties are intimately related to fluid behavior. It is obvious that different fluids can have grossly different characteristics. For example, gases are light and compressible, whereas liquids are heavy and relatively incompressible. To quantify the fluid behavior differences certain fluid properties are used. The fluid properties are mass density, specific weight, specific gravity, and specific volume.

Mass density, ρ is defined as the mass per unit volume (SI unit, kg/m^3)

$$\rho = \frac{mass, m}{volume, v}$$

Specific weight ω is defined as the weight per unit volume. (SI unit, N/m^3)

$$\omega = \rho g \qquad \text{(Where g=9.81m/sec}^2\text{)}$$

Specific gravity or relative density is the ratio of the weight of the substance to the weight of an equal volume of water at 4°C.

$$s = \frac{\omega_{substance}}{\omega_{water}} \quad \text{Or} \quad s = \frac{\rho_{substance}}{\rho_{water}}$$

Specific volume, v is defined as the reciprocal of mass density. It is used to mean volume per unit mass. (SI units, m3/kg)

$$v = \frac{1}{\rho} \quad v = \frac{volume, v}{mass, m}$$

D. MATERIAL / TOOLS

i. Plain Water
ii. Oil
iii. Dishwasher Liquid
iv. Measuring Cylinder
v. Beaker (1000 ml)
vi. Beaker (250 ml)
vii. Digital Weighing Scale

E. GENERAL INSTRUCTION / SAFETY PROCEDURE

i. Wear suitable attire when in the lab.
ii. Wear safety goggles while handling the liquids.
iii. Always clean droplets or excessive liquid at the working area during and after experiments.
iv. Always obey the Lecturer/Lab Assistant instructions.

F. WORK INSTRUCTION / PROCEDURE

i. Measure 100 ml of oil, 100 ml of water and 100 ml of dishwasher liquid using a 250 ml beaker.
ii. Determine the mass of each liquid respectively.
iii. Calculate mass density of oil, water, and dishwasher liquid.
iv. Pour those three liquids into a 1000 ml beaker.
v. Wait for a few minutes until all the liquids are separates.
vi. Discuss and make the conclusions.

G. RESULT

No.	Liquid	ml	Volume (m^3)	Mass (kg)	Mass Density (kg/m^3)	Specific Weight (N/m^3)	Specific Gravity	Specific Volume (m^3/kg)
1.	Water							
2.	Oil							
3.	Dishwasher liquid							

H. DISCUSSION

i. As the volume of the liquid is the same, what will happen to the mass?

ii. If the volume of the oil is increased, what will happen to its mass density?

iii. Based on your observations, did the three liquids mix or separate into layers? Explain.

I. REFERENCES

Douglas,J.F, J.M Gasiorek & J.A Swaffield (1996). Fluids Mechanics – (3rd Edition). Longman: Singapore Prasuhn, Alan L (1980). Fundamentals of Fluid Mechanics. Prentice-Hall: London

PREPARED BY: (Course Lecturer)	CHECKED BY: (Course Coordinator/ Head of Programme)	APPROVED BY: (Head of Programme/ Head of Department)
..... ( ) Date:	..... ( ) Date:	..... ( ) Date:

Nota :

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