# Carbon Energy (탄소에너지) (38523)

# - 2021 Midterm Examination -

**Student ID:** 

**Student Name:** 

### Notice

• Fill your name in the following:

"I, \_\_\_\_\_, swear I solve all problems by myself in this midterm examination. I will take any disadvantages if any dishonesty such as cheating is acted on my solution." 5 points will be deducted from your total score if you do not fill in your name above.

#### Problem 1.

For the sub-problems from 1-1 to 1-4, give the full names of the following abbreviations:

- 1-1. SCAL [2.5 pts.]
- 1-2. API [2.5 pts.]
- 1-3. STP [2.5 pts.]
- 1-4. EUR [2.5 pts.]

#### Problem 2.

Calculate the API gravity of crude oil to the first decimal place when oil density is 850 kg/m<sup>3</sup> and water density is 1,000 kg/m<sup>3</sup>. [10 pts.]

## Problem 3.

3-1. Explain the standard condition in petroleum engineering. [5 pts.]

3-2. Explain why hydrocarbon volume under a reservoir condition is different from hydrocarbon volume under the standard condition. [5 pts.]

## Problem 4.

- 4-1. Provide the definition of the term "Petroleum." [5 pts.]
- 4-2. Provide the definition of the term "Reserve." [5 pts.]
- 4-3. Explain the R/P ratio [5 pts.]

### Problem 5.

The energy mix refers to a group of different primary energy sources from which secondary energy for direct use (e.g., electricity) is produced. The figure below shows the regional energy consumption pattern in 2020, which is cited from BP Statistical Review of World Energy 2021. Provide appropriate names of primary energy sources from ① to ⑥ [15 pts.].



## Problem 6.

Below is a flow diagram of a concessionary system (i.e., royalty-tax system). Oil price is assumed as 100/STB. Fill in the blanks from ① to @ [10 pts.].



## Problem 7.

7-1. Calculate porosity of a clean sandstone composed of orthorhombic grains to the first decimal place. [5 pts.]

7-2. Calculate porosity of a clean sandstone composed of rhombohedral grains to the first decimal place. [5 pts.]



Herein,  $\pi \approx 3.14$ ,  $\sqrt{2} \approx 1.41$ .

# Problem 8.

Below is a graph for reserve estimation based on a probabilistic method. Provide appropriate names from A to J. [20 pts.].



Probabilistic Method

----- This is the End of the Midterm Examination ------