



## COVENANT UNIVERSITY

**TITLE OF EXAMINATION:** Test 1

**DEPARTMENT:** PETROLEUM ENGINEERING

**SESSION:** 2020/2021

**COURSE CODE:** PET328

**COURSE TITLE:** COMPUTER APPLICATIONS IN PETROLEUM ENGINEERING

**INSTRUCTION:** ATTEMPT TO ANSWER ALL QUESTIONS

**SEMESTER:** OMEGA

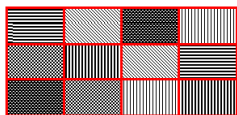
**CREDIT UNIT:** 2

**TIME:** 30 minutes

### Question 1: [7 marks]

The script shown below has been written to compute STOIIP for each block in a discretized reservoir model and to ultimately report the total STOIIP in such reservoir. For re-usability purposes, the Lead Software Developer in your team has requested that you convert the script to a function to be named *stoiip\_discretized*. The grid of porosity (*poro*) and initial water saturation (*swi*) values should be passed to the function as *poro\_list* and *swi\_list*, respectively; with the list index corresponding to the natural ordering of the grid blocks. The function should return a list (*stoiip\_list*) containing all STOIIP values, with elements arranged in natural ordering of the block. Additionally, the function should also return the total STOIIP value (*total\_stoiip*). A sample of the discretized model and grid values is provided below for your guidance.

```
#...TTOWG!
# input statements
Lx = float(input('what is the length of the reservoir in x-direction?'))
Ly = float(input('what is the length of the reservoir in y-direction?'))
h = float(input('what is the thickness of the reservoir?'))
nx = int(input('How many blocks there are in x-axis?'))
ny = int(input('How many blocks there are in y-axis?'))
boi = float(input('what is the value of initial oil FVF?'))
# discretizing the reservoir
delta_x = Lx/nx
delta_y = Ly/ny
# calculating the area per block
area = delta_x*delta_y
# initializing output variable
total_stoiip = 0
# the 'for' loop
for j in range(1,ny+1):
    for i in range(1,nx+1):
        block_n_order = (nx*(j-1))+i
        poro = float(input('what is the value of porosity for Block
{0}?' .format(block_n_order)))
        sw = float(input('what is the value of water saturation for Block
{0}?' .format(block_n_order)))
        block_stoiip = (7758*area*h*poro*(1-sw))/boi
        total_stoiip = total_stoiip + block_stoiip
        print('The amount of oil in Block {0} is {1:.2f} STB' .format(block_n_order,
block_stoiip))
# displaying the results.
print('The amount of oil in the entire reservoir is {0:.2f} STB' .format(total_stoiip))
```



Legend	
poro	swi
0.1	0.23
0.25	0.29
0.29	0.31
0.33	0.37
0.23	0.20
0.27	0.28

### Question 2: [3 marks]

Which of the two *for* loops in the script above runs fastest? [1 mark]

How many times (in terms of nx and ny) would Line 46 be executed? [1 mark]

For what purpose is the use of function *float* in the script above? [1 mark]

*Best wishes, now and always!!!*