

## Exercise 6

1. Pressure build-up test analysis data as follows:

$$\begin{aligned}
 Q_o &= 19.68 \text{ m}^3/\text{d} & N_p &= 80.03 \text{ m}^3 & t_p &= 97.6 \text{ h} & h &= 6.1 \text{ m} \\
 \Phi &= 0.20 & r_w &= 0.091 \text{ m} & \mu_o &= 1 \text{ mPa}\cdot\text{s} & B_o &= 1.22 \\
 C_t &= 29.4 \times 10^{-4} \text{ MPa}
 \end{aligned}$$

(1) Plot **Horner curve** and **MDH curve**

(2) Calculate  $K=?$   $P_i=?$

(3) Determine skin factor  $S=?$

shut-in time (h)	build-up pressure $P_{ws}$ (MPa)
0	30.635
0.5	31.802
0.66	32.007
1.0	32.197
1.5	32.313
2.0	32.361
2.5	32.388
3.0	32.401
4.0	32.422
6.0	32.449
8.0	32.469
10.0	32.480
12.0	32.497

$Q_o$  \_\_\_ Oil production rate ,m<sup>3</sup>/d

$t_p$  \_\_\_ Flowing time, h

$\Phi$  \_\_\_ Porosity

$\mu_o$  \_\_\_ Viscosity of oil

$C_t$  \_\_\_ Compression coefficient

$K$  \_\_\_ Efficient permeability , md

$FE$  \_\_\_ Flow efficiency

$N_p$  \_\_\_ Cumulative oil production (10<sup>4</sup> tons)

$h$  \_\_\_ Thickness , m

$r_w$  \_\_\_ Well radius , m

$B_o$  \_\_\_ The formation volume factor for oil

$P_i$  \_\_\_ Initial pressure, MPa;

$S$  \_\_\_ Skin factor

2. Oil well pressure drop curve of the data as below:

$$Q_o=239 \text{ m}^3/\text{d}, \quad C_t^*=C_t/S_{oi}=29.4 \times 10^{-4} \text{ MPa}^{-1}$$

Please calculate original oil-in-place  $N_o$  =?

<b>flowing time t (h)</b>	<b>flowing bottom hole pressure <math>P_{wf}</math> (MPa)</b>
0	23.809
1	19.844
2	19.728
3	19.646
5	19.517
10	19.252
15	19.007
20	18.789
40	18.027
60	17.619
80	16.619
100	15.925