

كلية الهندسة
قسم هندسة النفط
الزمن : ساعتان ونصف
أستاذ المقرر: أ. وليد بن صالح

رقم الطالب:

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اسم الطالب: 31/05/2016

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Question 1: (15 Points).

A. Answer the following:

- 1) Classify numerical reservoir simulators.
- 2) List the main data needed for a black oil simulator.
- 3) List the three main phases of reservoir simulation process.
- 4) Explain how numerical simulators can be abused.
- 5) What does IMPES, fully Implicit, fully explicit simulator mean?

B. According to your classification in part A (1) what type of simulator would you recommend for the following case studies and why:

- 1) A five spot water injection project
- 2) CO₂ injection project
- 3) Steam Injection project
- 4) Polymer injection project
- 5) Miscible gas injection project.
- 6) Immiscible gas injection project

Question 2: (10 Points)

- A. List Four objectives of reservoir management.
- B. What does data validation mean ? Give Examples
- C. What does history matching mean? How does it help reservoir simulation study?

Question 3: (15 points).

A. Given below is the general material balance equation for oil reservoir:

$$F = N(E_o + mE_g + E_{fw}) + W_e$$

Using the straight line method explain how to calculate the Initial oil/gas in place in case:

- 1) There's a water drive with no gas cap.
- 2) There's a gas cap with no water drive.
- 3) No gas cap nor water drive

B. List the most common decline curves used for oil reservoirs performance analysis.

Question 4: (10 points).

- A. List the different methods used to assess reservoir performance.
- B. List all the factors that influence reservoir performance.
- C. On a GOR VS Time graph and Reservoir Pressure Vs Time graph, show the characteristics of each the following drive mechanisms:

- i. Water Drive
- ii. Solution gas drive
- iii. Gas Cap drive