

# FINAL EXAMINATION REVIEW QUESTIONS

*For students of  
Petroleum Engineering MSc*

Production Technology Topic

## **1. Question**

### **Production Technology**

Multiphase vertical pipe flow fundamentals: basic equations, flow patterns, superficial velocities, gas slippage, liquid holdup.

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## **2. Question**

### **Production Technology**

Gas lift valves: main types, constructions, operations, valve setting.

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## **3. Question**

### **Production Technology**

Basic design of continuous flow gas lift installations, effects of operating parameters on performance.

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## **4. Question**

### **Production Technology**

Application of NODAL Analysis methods to find the liquid rate of a continuous flow gas lift well.

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**5. Question**

**Production Technology**

Unloading of continuous flow gas lift wells, unloading valve string design.

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**6. Question**

**Production Technology**

Problems of pumping gassy fluids, downhole gas separator types, their operational features.

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**7. Question**

**Production Technology**

Fatigue endurance of sucker rods. MGD for API and non-API materials. Rod string design principles.

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**8. Question**

**Production Technology**

Torsional loading of gearboxes, API torque analysis. Permissible loads, optimum counterbalancing.

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## **9. Question**

### **Production Technology**

Components of an ESP system: constructional details, operational features of pump, motor, protector, cable, surface, and downhole miscellaneous equipment.

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## **10. Question**

### **Production Technology**

Free gas volume at pump suction, ESP pump performance degradation, Turpin correlation. Possible solutions: motor shrouds, rotary gas separators. RGS construction, operation.

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## **11. Question**

### **Production Technology**

ESP installation design: well inflow calculations, TDH calculation, selection of the pump.

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## **12. Question**

### **Production Technology**

ESP installation design: selection of the motor, protector and cable.

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## **Information**

There is no preparation time during the final exam to develop the Questions.

The collection of formulas compiled by the Institute may be used for the final examination.

## **Recommended literature on topics**

- A.P. Szilas: Production and Transport of Oil and Gas. Part A., Akadémiai Kiadó, Budapest, 1986.
  - Takács G.: Fundamentals of Production Engineering. okt. segédlet, Miskolci Egyetem, 2005, 161p.
  - G. Takács: Gas Lift Manual., PennWell Corporation, Tulsa, USA. 2005. 478p, ISBN 0-87814-805-1.
  - George V.Chilingarian et.al.: Surface Operations in Petroleum Production II, Elsevier, 1989
  - Larry W. Luce: General Engineering, Petroleum Engineering Handbook Vol 1, SPE, 2006
  - Takács G.: Sucker-rod pumping manual. Tulsa : PennWell, 2003. 395 p. ISBN 0 87814 899 2
  - Production Operations Engineering, Petroleum Engineering Handbook Vol 4, SPE, 2006
  - Szilas, A.P.: Production and Transport of Oil and Gas. Part B., Akadémiai Kiadó, Budapest, 1986., ISBN 963-05-3363-4
  - Cholet, H.: Progressing cavity pumps. Editions Technip, Paris. 1997. 112p. ISBN 2-7108-0724-6.
  - Beggs, H. D.: Production Optimization Using NODAL Analysis, OGCI Publications, 2003. ISBN: 0-930972-14-7
  - Takács, G.: Electrical submersible pumps manual. Elsevier, 2009. 425 p. ISBN 978 1 85617 5579.
- Miskolc, 23/04/2024.

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