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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, April, 2017

Program/course: APE VIII (Upstream) | **Semester – VIII**
Subject: Well Stimulation | **Max. Marks : 100**
Code :PTEG 425 | **Duration : 3 Hrs**
No. of page/s:

Please read the questions and instructions carefully and give precise answers

SECTION A **Marks 20 (4*5)**

All questions are compulsory

1. What are detrital, secondary and authegenic minerals? Give examples of each.
2. What is well stimulation? How it is different from reservoir stimulation? Give example of reservoir stimulation.
3. What is acid and non-acid stimulation? Give examples of each.
4. What is self-generating mud acid? How it is generated? Give relevant chemical reactions.

SECTION B **Marks 40 (5*8)**

Question numbers 5,6,7,8 is compulsory and attempt any one from the rest

5. What is the role of additives in acidization? Discuss the role of corrosion inhibitors and iron control agents.
6. Draw and discuss a pressure response graph in a typical hydraulic fracturing operation. How bottom hole treating pressure and surface treating are calculated? Give relevant derivation.
7. What is hydrated silica? What are the reasons for its formation? Give relevant chemical reactions leading to formation of hydrated silica. What are its implications? What are mitigation methods?
8. What are different acid placement techniques in matrix acidization? Discuss different methods of chemical diversion.
9. What is fracture conductivity? Explain with relevant equation. How post fracture conductivity is calculated.
10. What is step rate test? Why it is conducted and why it is so important?

SECTION C **Marks 40 (2*20)**

All questions are compulsory. All parts carry equal marks

11. **(a)** What is the difference in PKN and KGD models for hydraulic fracturing? Explain with relevant equations. How to calculate maximum fracture width, average fracture width and fracture volume using PKN and KGD model.

    (b) What are different design considerations in design of matrix acid treatment? How acid volume and maximum injection rate is calculated for matrix acidization?

12(a) Explain with relevant equations fast and slow pressurization for fracture initiation and propagation.

(b) Discuss different phenomena during acid mineral interaction. What are different formulations for carbonate acidization? Discuss at least two.