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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination – December, 2018

Program/course: M.Tech. Petroleum Engineering. **Semester – III**

Subject: Artificial Lift Technology **Max. Marks : 100**
Code : PEAU 8002 **Duration : 3 Hrs**
No. of page/s:2

SECTION A **60 (4*15)**
ALL Questions are compulsory

Q.1 What are early life formation damage? Write mitigation methods of formation damage.

Q.2 How paraffin and asphaltenes cause formation damage?

Q.3 Write different methods of acid placement. Explain any two.

Q.4 What is the importance of IPR? How a future IPR is constructed?

Q.5 What are design considerations for designing gas lift.

Q.6 What is open completion in gas lift?

Q.7 What is working principle of gas lift
Q.8 Write reservoir characteristics and well bore characteristics considered for artificial lift.

Q.9 Write design procedure of SRP as per API 11L.

Q.10 What are self-diverting acids? How does it works in acid placement?

Q.11 What is hydrated silica? How it is formed during sand stone acidization? Write relevant chemical reactions. (2+1+1)

Q.12 How reservoir drive mechanisms effect choosing lift mode.

Q.13 What are sub surface components of ESP? Write design procedure of ESP

Q.14 What is the purpose of gas anchor in artificial lift?

Q.15 What are gravel size selection criterion? Explain with relevant co-relations.

SECTION B

Attempt any two **40 (20*2)**

Q.1

(a) Discuss different components of skin? Derive Hawkins formula. **(10)**

(b) Write detailed procedure with relevant equations for designing PCP. **(10)**

Q.2

(a) Pressure gradient equation for single phase incompressible fluid is given below

$$-144\frac{dp}{dl}=\frac{g}{g_c}[\rho Sin\theta]+\frac{f\rho v^2}{2g_c\ d}+\rho\frac{vdv}{g_c\alpha dl}$$

In this equation, total pressure gradient is sum of three principal components. Discuss them. **(10)**

(b) Transform the above equation in to multiphase equation giving detailed process. **(10)**

Q.3

(a) What are different types of downhole pumps in SRP? Explain one of them with relevant sketch. **(5+5)**

(b) What is peak polished rod load, minimum polished rod load, pump displacement, polished rod horse power and peak torque in a sucker rod pump. How peak polished rod load peak is calculated. **(5+5)**