Name: Enrolment No:	**UPES** UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination (Dec 2021)

Program: M. Tech. Petroleum Eng.   Semester: III
Course: Artificial Lift Technology   Time: 180 minute (3 hours)
Course Code: PEAU8002   Max. Marks: 100
Number of pages: 02

<div align="center">SECTION A</div>

Each question carries 4 points   **4 question X 5 points = 20**
Attempt all questions
Answer all questions in sequence. If you do not know the answer, leave a space in between questions
Answer in six sentences or less

Q.No	Question	CO
1.	State one difference and one similarity between hydraulic piston pump and hydraulic jet pump.	CO1
2.	State three flow situations where you would use PIPESIM simulator and two situations where you would use OLGA simulator.	CO1
3.	State the characteristic of a VLP and IPR curve plotted together, which indicates the requirement for artificial lift technology.	CO2
4.	Briefly state the operational methodology differences between an electrical submersible pump and progressive cavity pump. Also, mention one advantage and one limitation of each pump.	CO2
5.	Enumerate the parameters on which propped (i.e., after the proppant has been pumped) fracture width from hydraulic fracturing depends.	CO3

<div align="center">SECTION B</div>

Each question carries 10 points   **4 question X 10 points = 40**
Drawing diagrams allowed wherever you see fit
Answer all questions in sequence. If you do not know the answer, leave a space in between questions
Answer in ten sentences or less

Q.No	Question	CO
1.	Explain the differences between continuous gas lift and intermittent gas lift technology/operations. Also mention one advantage and one limitation of each.	CO3

2.	Discuss at least four steps (other than artificial lift technology) that could help increase flow from the reservoir to the wellhead in different situations.	CO4
3.	If P_{wf} calculated from Vogel's method is 5000 psi, a pump is set 500 ft above the perforations. Calculate the pump intake pressure. Fluid specific gravity is 0.8 (as compared to fresh water).	CO4
4.	Explain how plunger lift pump technology is different from sucker rod pump technology. Enumerate condition(s) under which would you would choose plunger lift technology over sucker rod pump technology. OR A 110 km long pipeline was found to be affected by terrain slugging at several locations along its length. Mention method(s) to deal with this problem. List problems that can occur when the slug is finally cleared.	CO4

SECTION C		
Each question carries 20 points **2 question X 20 points = 40** **Drawing diagrams allowed wherever you see fit** **Please answer in sequence** **No world limits**		
Q.No	Question	CO
1.	Calculate the breakdown pressure at 7500 ft for the following rock and reservoir conditions: The rock has a density of 180 lb/ft^3, rock Poisson's ratio = 0.25, tensile strength of rock=750 psi, Biot's coefficient = 0.7, pore pressure gradient is 0.44 psi/ft, $S_{tectonic}$=3000 psi.	CO5
2.	Explain the concept of flow assurance in detail. Evaluate its importance. State its different categories. Provided one or two short examples of each category. Is nodal analysis part of flow assurance? If so, how does it address problems related to flow assurance? OR a) Describe the different types of sucker rod pumping systems. Specify conditions under which you would use them. b) Discuss the functionalities of different components of a conventional (crank balanced) sucker rod pumping unit. c) List the sucker rod pumping wellhead components and mention their functions.	CO5