Name: Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: PEAU 3001 Production Engineering I Semester: V
Program: APE V(Upstream)
Time: 03 hrs. Max. Marks: 100

Instructions: Read instruction of each section carefully and give precise answers.

	SECTION A		MARKS 20 5*4
All questions are compulsory			

S. No.		Marks	CO
Q 1	What is the uses of swab valve in a Christmas tree?	4	CO 1
Q 2	Temperature correction factor is applied for dome type gas lift valve. Why? Give relevant equation.	4	CO 4
Q 3	What is paraffin and asphaltene in crude oil? How to remove paraffin and asphaltene in well intervention?	4	CO 6
Q 4	Explain with the help of sketch behavior of reservoir pressure, oil production profile and GOR in a gas cap type reservoir.	4	CO 2
Q 5	What are rigless well interventions? Explain one of them	4	CO 5
SECTION B		**MARKS 40 4*10**	
Q. 6, 7, 8 are compulsory. Do any one out of 9 and 10			
Q 6	a) List screening parameters for selection of PCP as a mode of artificial lift. Write design procedure of PCP b) Write design procedure of ESP with relevant equations. What are parameters, which can change performance of ESP?	5 Marks each	CO 4
Q 7	a) A well is flowing with a bottomhole pressure of p_{wf}. If well depth is "D" thousand feet, calculate casing pressure of this well. Assume well depth=Tubing depth b) What is S curve in sand control? It has been decided to go for sand control measures for oil field "A" and "B". Sand samples were collected of various wells of each field and were put to sieve analysis. After plotting, it was found that one field "A" exhibits poorly sorted sand and field "B" exhibits well sorted sand. What would be the shape of well-sorted sand and poorly sorted sand.	5 marks each	CO 2,5

Q 8	a) What are different methods of gravel pack in sand control? Explain one of them.. b) List out co-relations for calculating G-S ratio. What is the effect of G-S ratio in gravel pack permeability?	5 marks each	CO 5,6
Q 9	a) List out the main components of Coil tubing unit? What are main uses of CTU. b) Why there is a temperature drop across choke? Explain with relevant formula.	5 marks each	CO 6,1
Q 10	a) Explain with the help of a sketch a pumping cycle of SRP. b) There is a cyclic transfer of load during operation of SRP. What is the effect of this load on tubing and sucker rod?	5 marks each	CO 4

SECTION-C   **MARKS 40 2*20**

Question number 11 is compulsory. Attempt any one out of Q12 and 13

Q 11	(a) What is static level and dynamic level in artificial lift? What is their significance while designing any type of lift? (b) What is surface plunger stroke and effective stroke? Explain with relevant equations	a.10 b.10	CO 3, 4
Q 12	(a) A reservoir has three layers separated by an impermeable a layer so that each of these layers are independent. Layers have permeability of 1md, 100md and 10md respectively from bottom layer to top layer. Draw individual layer IPR and composite IPR. (b) A flowing well with 3000 ft. of tubing in the hole. At casing pressure 550 psig, its production rate is 42.bbl/day when casing pressure is 320 psig, production rate is 66 bbl./day. What is the productivity index of this well? Calculate static pressure of the well, and its potential? Assume straight line IPR	a.10. b. 10	CO 2
Q 13	(a) Pressure gradient equation for single phase incompressible fluid is given below $$-144\frac{dp}{dl} = \frac{g}{g_c}[\rho Sin\theta] + \frac{f\rho v^2}{2g_c d} + \rho\frac{vdv}{g_c \alpha dl}$$ Total pressure gradient is sum of three principal components. Discuss each of them. How to calculate value of "f"? (c) There are various flow regimes in multi-phase flow. These flow regimes are plotted in a graph given below. Give an analysis of the graph	a.10 b.10	CO 3