Name: Enrolment No:	UPES

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

Course: PTEG 422 Production Engineering II **Semester: VI**
Program: APE VI(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	Write individual process equipment for oil and gas separation.	4	CO 1
Q 2	Heating destabilizes an emulsion. Write heat input equation for heating an emulsion containing less than 10% water.	4	CO 2
Q 3	'K' factor represents pulses per unit volume in a turbine meter. List factors, which can have impact on 'K' factor.	4	CO 3
Q 4	What are the considerations for designing suction and discharge piping of a centrifugal pump?	4	CO 4
Q 5	Intelligent pigs are used for monitoring pipeline health. Name two such pigs.	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) Friction pressure drop in a multiphase system process pipelines is calculated by API RP14E.Write equation with boundary conditions. b) How to calculate individual components of equation (API RP 14 E).	5 Marks each	CO 5
Q 7	a) What are different steps in laying an onshore oil pipeline? Explain b) Draw a typical diagram of pig launcher and receiver.	5 marks each	CO 5
Q 8	a) What is Bedworth Pilling ratio and its significance? Discuss means to protect storage tanks from corrosion. b) What are different pipeline codes to determine pipe thickness for designing a pipeline? Write the code to design pipeline for transportation of liquid hydrocarbons.	5 marks each	CO 5,6
Q 9	a) Write and explain affinity laws for changing centrifugal pump performance.	5	CO 4

	b) Explain performance curve of centrifugal pump. What would be performance when pumps are in series?	**marks each**	
Q 10	a) How to specify compressor capacity? Explain with relevant equations. b) How to calculate power requirement for a centrifugal compressor and reciprocating compressor?	**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)** Demulsification relies on gravity separation of water from oil. Water settling is resisted by drag. Explain water separation by gravity using relevant equations. **(b)** Calculate free settling velocity of a water drop of 10 micron. Specific density of oil is 0.8 and that of water 1.02.	**a.10** **b.10**	**CO 2**
Q 11	**(a)** Oil and gas separators are fitted with different type of end closures. Write different types of end closure along with its design equations. **(b)** How to design inlet nozzle for an oil and gas separator? Write guiding principles and relevant design equations.	**a.10.** **b. 10**	**CO 1**
Q 13	**(a)** Explain theoretical lift, actual lift, acceleration head and total dynamic head. How total dynamic head is calculated? How to calculate power requirement for positive displacement, pump? **(b)** What is design procedure for designing inlet and outlet of centrifugal pump?	**a.10** **b.10**	**CO 4**