UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2018

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
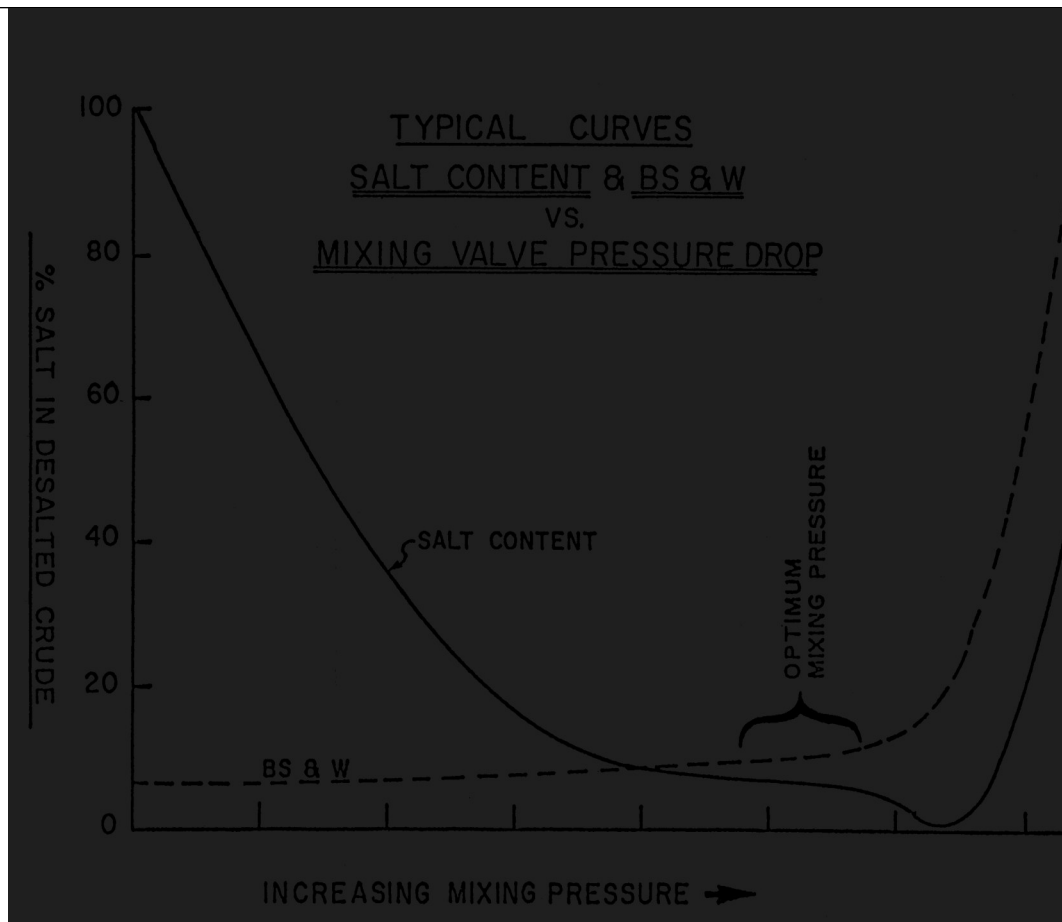
S. No.		Marks	CO
Q 1	What is the objective of field processing of oil? Write typical viscosity range for oil, gas and condensate	4	CO 1
Q 2	List out major factors controlling the sizing of oil and gas separators.	4	CO 2
Q 3	What is the function of flow straightener?	4	CO 3
Q 4	What are the considerations for designing suction and discharge piping of a centrifugal pump?	4	CO 4
Q 5	What is an intelligent pig? Name two different types of 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) Irrespective of the size or shape of a separator, every gas-liquid separator has four major sections. List out each of them and explain each.
b) Purpose of a desalting system is to reduce the salt content of the treated oil to acceptable levels. The degree of dispersion of the fresh water depends primarily on the pressure drop imparted by the mixing valve. Study the graph given below and give a critical analysis | 5 Marks each | CO 1,2 |

TYPICAL CURVES
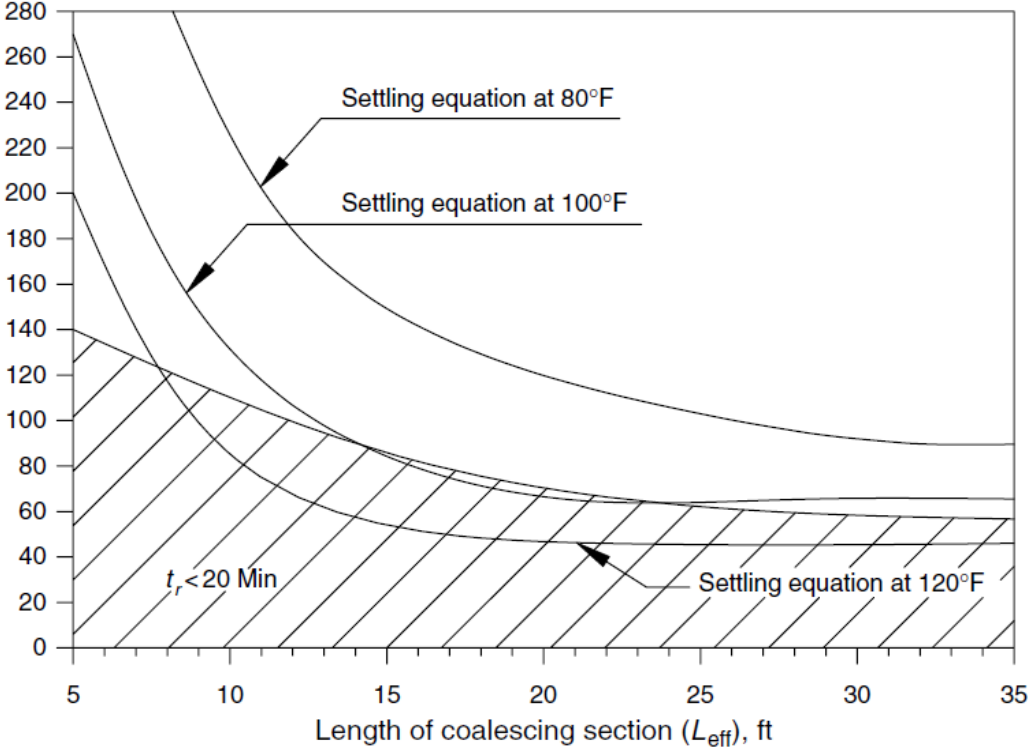SALT CONTENT & BS & W
VS.
MIXING VALVE PRESSURE DROP

Q 7	a) What is compression theory for gas compressors? Explain performance of centrifugal compressor with relevant graph. b) Draw a typical flow diagram for centrifugal gas compressor and explain function of different components.	5 marks each	CO 4
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? Write one design equation	5 marks each	CO 4,5,6
Q 9	a) How to change performance of a centrifugal pump? Write affinity laws and give analysis. b) Write outlines of pipeline laying for onshore. How to protect pipelines from corrosion?	5 marks each	CO 4,6
Q 10	a) Explain performance curve of centrifugal pump. What would be performance when pumps are in series? b) Write and explain process and mechanical design considerations for designing a pump.	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) Write simplified pressure drop formula as per API RP 14E for multiphase pipeline along with boundary conditions. How pressure drop and pipe diameter is calculated? (b) Define 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?	a.10 b.10	CO 4,5
Q 11	(a) List out major factors controlling the sizing of emulsion treating equipment. Give a detailed procedure for designing a horizontal heater treater. (b) Discuss the graph given below 	a.10. b. 10	CO 2
Q 13	(a) Geometry and physical and operating characteristics give each separator type advantages and disadvantages. Discuss separator selection criteria. (b) Discuss process design of a vertical separator with relevant design equations. What are the mechanical design considerations for separator?	a.10 b.10	CO 1