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Courses » Upstream LNG Technology

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Unit 13 - Week 12

Course outline

[How to access the portal](#)[Week 1](#)[Week 2](#)[Week 3](#)[Week 4](#)[Week 5](#)[Week 6](#)[Week 7](#)[Week 8](#)[Week 9](#)[Week 10](#)[Week 11](#)[Week 12](#) Lecture 80 : Hydrocarbon recovery in natural gas system - II Lecture 81 : Hydrocarbon recovery in

Week 12 Assignment 12

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2018-10-24, 23:59 IST.**

1) Which among the following is NOT TRUE regarding low temperature separators used for hydrocarbon recovery **1 point**

- a) Can be used both on shore and off shore
- b) Involves partial vaporization of the liquid product
- c) External cooling may be used for the separation
- d) Presence of water may lead to hydrate formation

No, the answer is incorrect.

Score: 0

Accepted Answers:

b) Involves partial vaporization of the liquid product

2) Which among the following is/are NOT TRUE regarding the twister separator used for hydrocarbon recovery **1 point**

- a) Twister separator is low weighing and small
- b) Is driven by absolute pressure
- c) Pressure drop is high
- d) Isentropic efficiency is high

No, the answer is incorrect.

Score: 0

Accepted Answers:

b) Is driven by absolute pressure

c) Pressure drop is high

3) Which among the following is/are TRUE regarding membrane hydrocarbon recovery **1 point**

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Lecture 83 :
Piping in
natural gas
systems - I

Lecture 84 :
Piping in
natural gas
systems - II

Lecture 85 :
Tutorial on
piping in natural
gas systems - I

Lecture 86 :
Tutorial on
piping in natural
gas systems - II

Lecture
Materials

Quiz : Week 12
Assignment 12

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**Assignment
Solution**

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Session with
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ce De

Score: 0

Accepted Answers:

- a. Absence of moving parts
- b. High turndown ratio
- c. May be used offshore
- d. Light weight

4) A JT-valve is/are always used parallel to the turboexpander to

1 point

- a. Help in plant start up
- b. Handle excess gas flow rates
- c. To freeze CO₂ in the process lines
- d. Act as standby, if the turboexpander breakdown

No, the answer is incorrect.

Score: 0

Accepted Answers:

- a. Help in plant start up
- b. Handle excess gas flow rates
- d. Act as standby, if the turboexpander breakdown

5) The flow rate of propane in a propane refrigeration system with an evaporator duty of 12.7 **1 point**
MJ/hr operating between temperatures 30°F (evaporator) and 105°F (condenser) is about

Properties of Saturated Propane in Engineering Units

Kidney, A.J., Parrish, W.R. and McCartney, D.G., 2011. Fundamentals of Natural Gas Processing. CRC Press.

Temp (°F)	Pressure (psia)	Liquid Density (lb/ft ³)	Vapor Volume (ft ³ /lb)	Enthalpy (Btu/lb)		Entropy (Btu/lb-°F)		Temp (°F)
				Liquid	Vapor	Liquid	Vapor	
15.00	51.012	33.80	2.0605	30.900	197.620	0.06872	0.41994	15.00
20.00	55.844	33.37	1.8899	33.836	198.970	0.07482	0.41908	20.00
25.00	61.011	33.34	1.7362	36.796	200.310	0.08090	0.41827	25.00
30.00	66.527	33.10	1.5975	39.781	201.640	0.08696	0.41751	30.00
35.00	72.406	32.86	1.4719	42.791	202.960	0.09301	0.41680	35.00
40.00	78.662	32.62	1.3581	45.827	204.270	0.09905	0.41613	40.00
45.00	85.310	32.38	1.2548	48.889	205.560	0.10507	0.41550	45.00
50.00	92.365	32.13	1.1607	51.979	206.830	0.11108	0.41491	50.00
55.00	99.841	31.88	1.0749	55.097	208.090	0.11708	0.41435	55.00
60.00	107.750	31.62	0.99652	58.245	209.330	0.12308	0.41382	60.00
65.00	116.120	31.36	0.92479	61.422	210.560	0.12907	0.41332	65.00
70.00	124.950	31.10	0.85903	64.630	211.760	0.13506	0.41283	70.00
75.00	134.260	30.83	0.79865	67.870	212.940	0.14104	0.41237	75.00
80.00	144.080	30.56	0.74310	71.144	214.090	0.14703	0.41191	80.00
85.00	154.410	30.28	0.69192	74.452	215.220	0.15301	0.41146	85.00
90.00	165.270	29.99	0.64468	77.797	216.320	0.15900	0.41102	90.00
95.00	176.680	29.70	0.60102	81.178	217.390	0.16500	0.41058	95.00
100.00	188.650	29.40	0.56059	84.600	218.430	0.17100	0.41013	100.00
105.00	201.200	29.10	0.52310	88.062	219.430	0.17702	0.40966	105.00
110.00	214.360	28.79	0.48828	91.568	220.390	0.18305	0.40918	110.00
115.00	228.140	28.47	0.45588	95.120	221.300	0.18911	0.40868	115.00
120.00	242.550	28.14	0.42569	98.721	222.170	0.19518	0.40814	120.00
125.00	257.620	27.80	0.39751	102.370	222.980	0.20129	0.40756	125.00
130.00	273.370	27.45	0.37116	106.080	223.730	0.20743	0.40694	130.00
135.00	289.820	27.08	0.34648	109.860	224.420	0.21361	0.40625	135.00
140.00	306.980	26.71	0.32331	113.690	225.030	0.21984	0.40549	140.00
145.00	324.900	26.32	0.30152	117.610	225.550	0.22613	0.40464	145.00

- a. 734lb/hr
- b. 12.5lb/hr
- c. 106lb/hr
- d. 547lb/hr

No, the answer is incorrect.

Score: 0

Accepted Answers:

c. 106lb/hr

6) Use the following information to solve Questions 6 and 7.

1 point

A gas flowing through an NPS 16 pipe, Schedule 10 has a flow rate of 70 MMSCFD, taking standard temperature as 50 °F temperature, and standard pressure as 14.7 psia, and the compressibility factor as 1.0.

Nom. Pipe Sizes		OD inches	OD mm	Schedule Designations ANSI/ASME	Wall Thickn. inches	Wall Thickn. mm	Lbs/Ft	Kg/m
Inches	mm DN							
16"	400	16.000	406.40	10	0.250	6.35	42.050	62.58

The compressibility factor becomes 0.89 when the gas flows at 90°F temperature, and 1500 psig pressure.

The flow rate of the gas, in MMSCFD, at 90°F and 1500 psig is

- a. 0.987
- b. 1.78
- c. 0.652
- d. 0.235

No, the answer is incorrect.

Score: 0

Accepted Answers:

c. 0.652

7) The flow velocity of the gas, in ft/s, at 90°F and 1500 psig is

1 point

- a. 5.80
- b. 12.5
- c. 1.25
- d. 4.74

No, the answer is incorrect.

Score: 0

Accepted Answers:

a. 5.80

8)

1 point

A gas with gas gravity of 0.6 and compressibility factor 0.85, enters a NPS 20 pipe of Schedule 30 at 90 °F and 1500 psig. The pressure at a distance of 10 miles from the inlet is found to be 600 psig. Assume the friction factor to be 0.02. Consider the standard temperature and pressure to be 70 °F and 14.7 psia respectively.

Nom. Pipe Sizes		OD inches	OD mm	Schedule Designations ANSI/ASME	Wall Thickn. inches	Wall Thickn. mm	Lbs/Ft	Kg/m
Inches	mm DN							
20"	500	20.000	508.00	XS/30/80S	0.500	12.70	104.130	154.97

The flow rate of the gas, in MMSCFD, is

- a. 154
- b. 785

c. 401 d. 813**No, the answer is incorrect.****Score: 0****Accepted Answers:***d. 813*

9)

1 point

A gas having gas gravity of 0.7 and viscosity of 8.0×10^{-6} lb/(ft · s) is flowing through a 20 NPS schedule 30 pipeline at a flow rate of 150 MMSCFD. Take the standard temperature and pressure to be 70 °F and 14.7 psia respectively.

Nom. Pipe Sizes		OD inches	OD mm	Schedule Designations ANSI/ASME	Wall Thickn. inches	Wall Thickn. mm	Lbs/Ft	Kg/m
Inches	mm DN							
20"	500	20.000	508.00	XS/30/80S	0.500	12.70	104.130	154.97

If the absolute pipe roughness is 7.0×10^{-4} in, and bend index is 60°, the transmission factor using the AGA method is

 a. 54 b. 0.5 c. 20 d. 47**No, the answer is incorrect.****Score: 0****Accepted Answers:***c. 20*

10) The General Flow-equation correlates the pressure drop of a flowing fluid with

1 point a. Fluid temperature b. Fluid velocity c. Pipe size d. Fluid properties**No, the answer is incorrect.****Score: 0****Accepted Answers:***a. Fluid temperature**b. Fluid velocity**c. Pipe size**d. Fluid properties*



