Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2020

Programme Name: B.Tech., APE Gas **Semester :** VII

Course Name : Production Engineering - II **Time :** 03 hrs

Course Code : PEAU 4103 **Max. Marks :** 100

Nos. of page(s) : 2

Instructions: 1. Assume any data missing.
2. Attach any graphs and/or data sheets (if any) used to the answer sheets for evaluation

SNo	SECTION A (6*5=30M)	Marks	CO
Q 1	Define productivity index and Classify reservoirs based on productivity index	**5**	**CO1**
Q 2	Mention the significance the terms of the following API rating of pumping unit: "C - 160 D – 200 – 74"	**5**	**CO2**
Q 3	Classify various types of gas lift methods	**5**	**CO3**
Q 4	List the components of gas lift valve and classify the gas lift valves	**5**	**CO3**
Q 5	Classify the gas lift installations	**5**	**CO3**
Q 6	List advantages of hydraulic piston pump	**5**	**CO4**
	SECTION B (5*10=50M)		
Q 7	A well producing from a pay zone between 5000 to 5052 ft is completed with 2 7/8" tubing hung at 5000 ft. The well has a bottom-hole static pressure of 2000 psi and a productivity index of 0.3 bbl/day/psi and produces with a gas/oil ratio of 300 cu.ft/bbl and a water cut of 10%. At *what rate* will the well flow with a tubing-head pressure of 100 psi.	**10**	**CO1**
Q 8	*Show that* for a given plunger size, maximum plunger displacement rate (i.e., maximum swept volume per day) is obtained by using the longest stroke available, even at the expense of accepting fewest strokes per minute.	**10**	**CO2**
Q 9	From the following data of gas lift well, *Calculate the point of injection using Graphical procedure*: Depth to mid perforations = 7500 ft; Oil gravity = 35^0API; Gas gravity = 0.65; injected gas surface temperature = 100^0F; Water fraction = 0; Formation GOR = 200 scf/STB; Flowing well head pressure = 100 psi (280 available); T_{wh} = 100^0F; Tubing I.D. = 1.995 in.; Surface operating pressure = 870 psi; Kickoff pressure = 920 psi; Reservoir Temperature = 182^0F; Load fluid gradient = 0.5 psi/ft; static liquid level is at surface; Desired production rate = 600 STB oil/day; From a previous test: P_R = 2000 pso; q_o = 383 STB/day for P_{wf} = 1850 psi.	**10**	**CO3**
Q10	From the following data of continuous gas lift well, *Space the valves using Graphical or analytical procedure*: Depth to mid perforations = 7500 ft; Oil gravity = 35^0API; Gas gravity = 0.65; injected gas surface temperature = 100^0F; Water fraction = 0; Formation GOR = 200 scf/STB; Flowing well head pressure = 100 psi (280 available); T_{wh} = 100^0F; Tubing I.D. = 1.995 in.; Surface operating pressure = 870 psi; Kickoff pressure = 920 psi; Reservoir Temperature = 182^0F; Load fluid gradient = 0.5 psi/ft; static liquid level is at surface;	**10**	**CO3**

	Desired production rate = 600 STB oil/day; From a previous test: P_R = 2000 pso; q_o = 383 STB/day for P_{wf} = 1850 psi.		
Q11	Explain with a neat diagram the working principle of hydraulic jet pump	**10**	**CO4**
SECTION-C (1*20=20M)			
Q12	A 7500-ft-deep well produces 35ºAPI oil with GOR 200 scf/stb and zero water cut through a 1.995 -in. ID tubing in a 7-in. casing. The oil has a formation volume factor of 1.25 and average viscosity of 5 cp. Gas-specific gravity is 0.65. The surface and bottom-hole temperatures are 100°F and 182°F, respectively. A test projected a reservoir pressure 2000 psia and a oil production rate of 383 STB/day for P_{wf} = 1850 psi with the IPR of the well described by the Vogel model. If the well is to be put in production with an ESP to produce oil at 600 stb/day against a flowing wellhead pressure of 100 psia. *Determine the required specifications for an ESP for this application.*	**20**	**CO4**