Name:

Enrolment No:

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Term Examination – May 2021

Program: B.Tech APE (Gas) **Semester: VI**
Course: City Gas Distribution and Pipeline Network Analysis **Time: 03 hrs.**
Code: CHGS 3023
Max Marks :100
Assume date if necessary

SECTION A (6*5=30)

1	What are applications of natural gas in industrial sector?	**05**	**CO1**
2	List different valves used in CGD and their functions.	**05**	**CO2**
3	What are different materials used for pipeline?	**05**	**CO3**
4	List safety devices in CGS.	**05**	**CO5**
5	What are applications of pipeline network analysis to gas system?	**05**	**CO4**
6	What are different types of networks in CGD? Mention pressure range and materials used in each type of network.	**05**	**CO2**

SECTION B (5*10=50 Marks)

7	Explain emergency response and disaster management plan for CGD	**10**	**CO5**
8	What are applications of turbine flow meter and rotary meter in CGD? Explain these meters with neat sketch.	**10**	**CO2**
9	An existing 140mm supplies gas from A to B a distance 1200m. It is proposed to double the demand at B & reinforce the existing pipe with parallel pipe so that original pressure remains constant. Calculate length of reinforcement for 120mm, 140mm 180mm.	**10**	**CO4**
10	If size of pipe in above example is further increased to 200mm and 220 what will be the effect on length of reinforcement and discuss your results.	**10**	**CO4**
11	A gas pipeline, NPS 16 with 0.250 in. wall thickness, 55 mi long, transports natural gas (specific gravity =0.6 and viscosity =0.000008 lb/ft-s) at a flow rate of 120 MMSCFD at an inlet temperature of 60 °F. Assuming isothermal flow, calculate the inlet pressure required if the required delivery pressure at the pipeline terminus is 920 psig. The base pressure and base temperature are 14.7 psig and 60°F, respectively. Consider elevation changes as follows: inlet elevation of 120 ft and elevation at delivery point of 450 ft, with elevation at the midpoint of 220 ft.	**10**	**CO1**

	$\text{Re} = 0.0004778\left(\frac{Pb}{Tb}\right)\left(\frac{GQ}{\mu D}\right)$ $Q = 77.54(\frac{Tb}{Pb})((P_1^2 - P_2^2)/GLZfT_f)^{0.5}D^{2.5}$ $S = 0.0375G(H_2 - H_1)/T_f Z$		
SECTION-C (20*1=20) (Solve any one)			
12	Describe facilities at city gate station in detail. Or Discuss design aspects of steel grid network in detail.	**20**	**CO2**