BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP2023)

CLASS: B.TECH. **SEMESTER : VI**
BRANCH: CHEMICAL/P&P **SESSION : SP2023**

SUBJECT: CL326 RESERVOIR ENGINEERING

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

		Marks	CO	BL
Q.1(a)	What are the differences between oil and gas reservoir?	[2]	1	2
Q.1(b)	Discuss the differences between siltstone, claystone, mudstone, slate, and shale.	[3]	1	2
Q.2(a)	Discuss the factors affecting the secondary porosity in the reservoir	[2]	1	2
Q.2(b)	A brine is used to measure the absolute permeability of a core plug. The rock sample is 5 cm long and 6 cm_2 in cross section. The brine has a viscosity of 1.1 cp and is flowing a constant rate of 0.5 cm_3/sec under a 2.0 atm pressure differential. Calculate the absolute permeability.	[3]	1	3
Q.3(a)	Derive the capillary pressure from force balance equation in capillary rise.	[2]	1	2
Q.3(b)	Calculate the capillary pressure, and capillary rise in an oil-water system from the following data:	[3]	1	3

$\theta = 35^\circ$ $\rho_w = 1.0\,\text{gm/cm}^3$ $\rho_o = 0.86\,\text{gm/cm}^3$

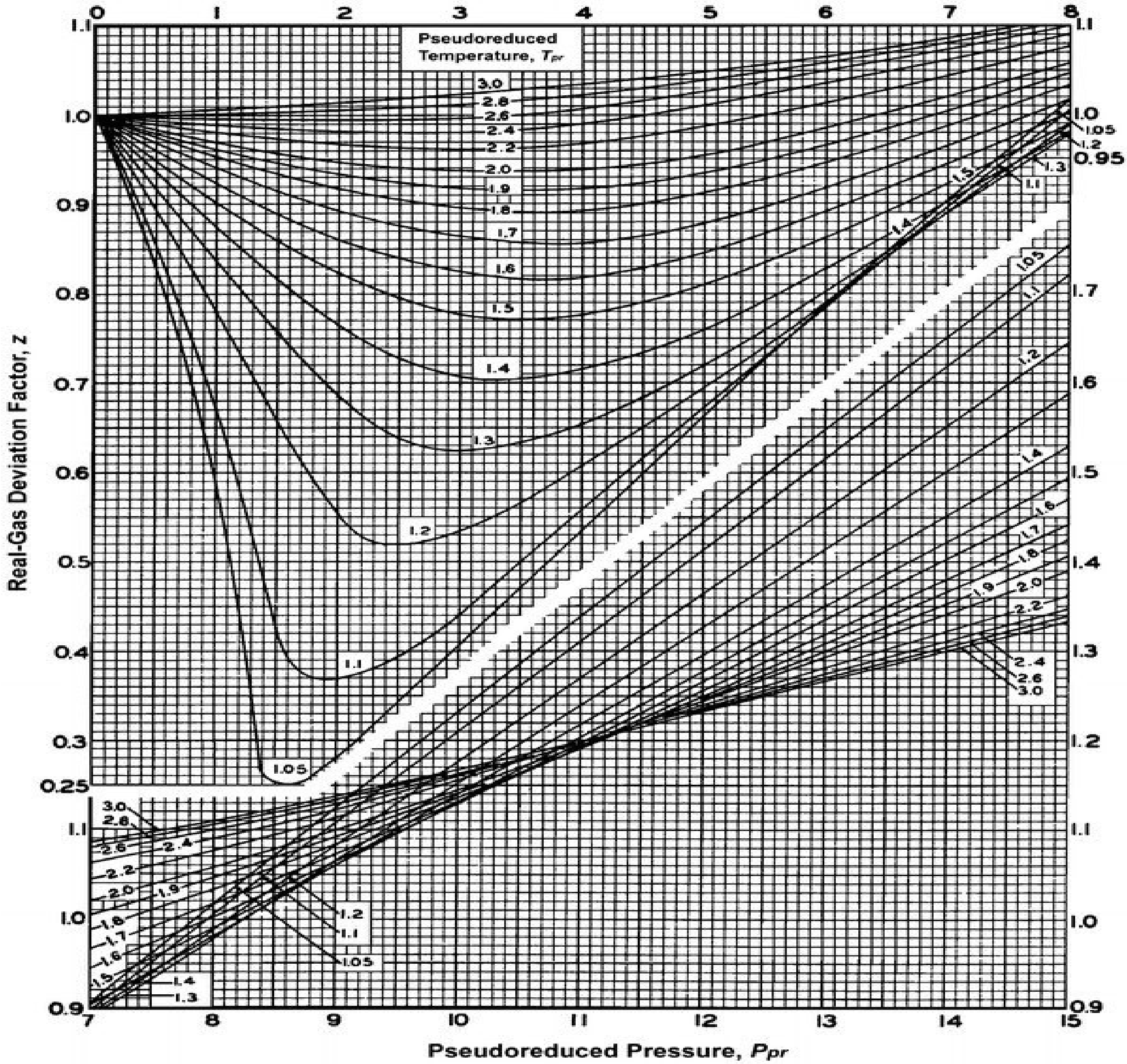
$r = 10^{-4}\,\text{cm}$ $\sigma_{ow} = 25\,\text{dynes/cm}$

		Marks	CO	BL
Q.4(a)	Show the cricondentherm, cricondenbar, quality lines and critical point for low shrinkage oil in phase diagram	[2]	1	1
Q.4(b)	Explain the retrograde condensation with a schematic diagram.	[3]	1	2
Q.5(a)	A natural gas has the following composition:	[5]	1	3

component	C1	C2	C3	i-C4	n-C4	i-C5	n-C5	N_2
Mole fraction	0.75	0.1	0.05	0.04	0.03	0.02	0.01	0

Reservoir conditions are 3,500 psia and 200°F. Calculate gas compressibility factor.

PTO



Standing and Katz compressibility factors chart. (Courtesy of GPSA and GPA Engineering Data Book, EO Edition, 1987)

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