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Bengaluru

Mid Term Examinations - October 2026

Date: 06/10/2026 **Time:** 09:30 AM - 11:00 AM

Course Code: MEC3440 **Course Name:** Fixed Equipment in Oil and Gas Industry

Semester: Seventh Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2
Marks	46	44

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	What is the functional difference between a boiler and an autoclave?	2	CO1	BT1
2	What is a pressure vessel?	2	CO1	BT1
3	What is a recuperative heat exchanger?	2	CO1	BT1
4	Define joint efficiency.	2	CO2	BT1
5	What is the joint efficiency for fully radiographed welds?	2	CO2	BT2

PARTB: Answer Any 1 Following Questions. 20 M

Q.N.	Questions	M	CO	BT
06.A	Explain the functional classification of pressure vessels.	10	CO1	BT2
06.B	Explain the functional classification of heat exchangers.	10	CO1	BT2
07.A	Describe the five critical components of a pressure vessel.	10	CO1	BT2
07.B	Derive the hoop stress equation for cylindrical shell thickness under internal pressure.	10	CO1	BT2

PARTC: Answer Any 1 Following Questions. 20 M

Q.N.	Questions	M	CO	BT
08.A	A pressure vessel constructed from SA-516 Grade 70 steel has an internal diameter of 8 ft and operates at 100 psi. The weld joint efficiency is 0.85 and corrosion allowance is 0.125 in. Determine the hemispherical head thickness.	10	CO2	BT3
08.B	A carbon steel cylindrical shell with a length of 120 in. and a nominal inside diameter of 48 in. is designed to operate under an external pressure of 15 psi. The design temperature is 200°F. Assuming the shell is stiffened, determine the required wall thickness and the spacing of the stiffening rings. Use SA-285 Grade C material. Assume initial thickness of shell is 0.5''	10	CO2	BT3
09.A	A spherical pressure vessel is made of SA-240 Type 304 stainless steel with an inside radius of 40 inches. The vessel has a seamless shell and operates at a design temperature of 300°F. If the minimum required thickness of the shell is 0.5 inches, Solve for the maximum allowable working pressure (MAWP)? Assume an allowable stress (S) of 20,000 psi.	10	CO2	BT3

09.B	A carbon steel cylindrical shell with a length of 120 in. and a nominal inside diameter of 48 in. is designed to operate under an external pressure of 15 psi. The design temperature is 200°F. Assuming the shell is stiffened, solve for the required wall thickness and the spacing of the stiffening rings. Use SA-285 Grade C material.	10	CO2	BT3