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Sixth Semester B.E. Degree Examination

Chemical Equipment Design

TIME: 03 Hours

Max. Marks: 100

- Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.
02.
03.

Module -1			*Bloom's Taxonomy Level	Marks
Q.01	a	With a flow sheet give the general design procedure of a chemical process plant	L2`	5
	b	Mention the general classification of chemical equipment with suitable examples	L1	5
	c	Explain various design parameters considered for process equipment	L2	10
OR				
Q.02	a	Discuss mechanical properties of materials and materials of construction	L2	10
	b	Explain stresses due to static and dynamic loads.	L2	10
Module-2				
Q. 03	a	Discuss the design of bracket support for vessels	L2	10
	b	Explain saddle and skirt support with sketch	L2	10
OR				
Q.04	a	How flange are classified? Discuss with neat diagrams	L2	6
	b	Discuss the steps involved in the gasket design.	L2	8
	c	Estimate the thickness of (100-10) dished head, 2:1 elliptical head and conical head with 100 apex angle for a cylindrical shell of 1.5 m ID, 2 m height, operating at 14 bar and 250 Estimate the thickness of (100-10) dished head, 2:1 elliptical head and conical head with 100°C.	L3	6
Module-3				
Q. 05	a	What are the types of floating roofs considered for storage vessels?	L1	10
	b	A tank is to store 24000 kg of a liquid having density 900 kg/m ³ . Due to space limitations the maximum tank diameter can be 2.4 m. Calculate the height of the tank. Liquid is to be filled up to roof to shell junction. No corrosion allowance is necessary. Weld joint efficiency is 85%. Permissible stress of the material is 1020 kg/m ³	L3	10
OR				
Q. 06	a	Discuss the five important accessories /mountings used in storage	L2	10
	b	A cylindrical storage tank of 30 m diameter and 15 m height is to store hydrocarbon fuel of density 810 kg/m ³ . Determine the thickness of bottom cover plate of the storage tank	L3	10
Module-4				
Q. 07	a	Explain the concept of mixing and agitation and show the sketches of different mixing impellers	L2	10
	b	Draw a neat sketch of reaction vessel and indicate role of each component	L2	10
OR				
Q. 08	a	Explain how the power required for agitation is estimated?	L2	10
	b	Discuss code of practice of jackets with neat diagram	L1	10
Module-5				
Q. 09	a	With neat sketch explain various types of loads acting, stresses and bending moments induced in tall vertical vessels	L2	12
	b	Draw a neat sketch of support for tall vertical vessel	L2	8

OR				
Q. 10	a	Explain various types of pipe fittings employed with their notations	L2	10
	b	Explain how the pipe size required for duty is determined?	L2	10

*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.