Reg.No. _____

Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Arrear May 2107

Semester : 2016-17 EVEN

Code : 14FP2024 **Duration : 3hrs**

Sub. Name : Mechanical Systems for Food Processing **Max. marks : 100**

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	A double-acting reciprocating pump, running at 40 r.p.m., is discharging 1.0 m^3 of water per minute. The pump has a stroke of 400 mm. The diameter of the piston is 200 mm. The delivery and suction head are 20 m and 5 m respectively. Find the slip of the pump and power required to drive the pump.	CO1	20
		(OR)		
2.	a.	Describe the working, construction and applications of the following pumps with diagram: (i) Membrane pump	CO1	10
	b.	(ii) Gear pump	CO1	10
3.	a.	A solid shaft 125 mm in diameter transmits 120 kW at 160 rpm. Find the maximum shear stress induced in the shaft. Find also the angle of twist in a length of 7.5 m. Take C = 8 x 104 N/mm^2.	CO2	20
		(OR)		
4.	a.	Discuss about the design and application of these couplings: (i) Universal coupling	CO2	10
	b.	(ii) Oldham coupling		10
5.	a.	An open belt drive is used for power transmission from driving shaft having larger pulley of 400 mm in diameter. The smaller pulley on driven shaft is having 250 mm in diameter and centre distance between two shafts is 2.5 m. If the axes of two shafts are parallel and in the same plane, find the length of the belt required. Find also the length of the belt if it is a cross belt drive.	CO2	20
		(OR)		
6.	a.	Explain the construction, working, advantages and limitations of Babcock and Wilcox boiler with a labelled sketch.	CO2	20
7.	a.	28 tons of ice from and at 0°C is produced per day in an ammonia refrigerator. The temperature range in the compressor is from 25^0 C to -15^0 C. The vapour is dry and saturated at the end of compression and an expansion valve is used. Assuming a coefficient of performance of 62% of the theoretical, calculate the power required to drive the compressor.	CO3	20

Temperature ^{0} C	Enthalpy (kJ/kg) Liquid	Enthalpy (kJ/kg) Vapour	Entropy of liquid (kJ/kgK)	Entropy of vapour (kJ/kgK)
25	100.04	1319.22	0.3473	4.4852
-15	-54.56	1304.99	-2.1338	5.0585

		(OR)		
8.	a.	Describe the construction, operation and application of the following cooling methods: (i) Hydrocooling	CO3	7
	b.	(ii) Tunnel Cooling		7

	c.	(iii) Vacuum Cooling		**6**
		Compulsory:		
9.	a.	Evaluate the applications of various type of material handling equipment in various aspects of food industries.	CO3	**20**

ALL THE BEST