Name:		
Enrolment No:		U UPES
		UNIVERSITY WITH A PURPOSE
	UNIVERSITY OF PETROLEUM & ENERGY STUDIES	
	Online End Semester Examination, Dec 2021	
Course: Automat		nester:VII
-		ne:03 Hrs
Course Code: M	EPD4011 Ma	x Marks: 100
	Common for B.Tech ADE, Mechatronics & Mechanical	
1 Each Question	Section A	
Sl.N	will carry 4 Marks   Question	CO's
Q1	List for the reasons for Automation.	CO1 CO1
Q2	Identify the various types of variables and parameters in process industries and discrete manufacturing industries	COI
03	process industries and discrete manufacturing industries Define the term sensor, transducer and actuator.	CO2
Q3	Classify different types of material handling equipment.	CO2
Q4 Q5	List the different types of AGV (automated guided	CO2
QJ	vehicles) i.e. being used in industrial automation.	02
	Section B	
1. Each Question	will carry 10 Marks	
Q1	Comment the significance of manual labor in	CO2
	manufacturing support system.	
Q2	A planned fleet of forklift truck has an average trav	el CO3
	distance per delivery =500 ft loaded and an average empty	
	travel distance =350 ft. The fleet must make a total of $\epsilon$	
	del/hour. Loads and unload times are each 0.5 minute ar	
	the speed of the vehicles 300ft/minutes. The traffic for the	
	system is 0.85. Availability is expected to be 0.95 ar	
	worker efficiency is assumed to be 0.90. Determine: (a	
	Ideal cycle time per delivery (b) the resulting average	
	number of deliveries per hour that a forklift truck can make	
	and (d) how many trucks are required to accomplish the	ie
02	60del/hour.	at CO4
Q3	A roller conveyor moves tote pans in one direction 150ft/min between a load station	at CO4
	and an unload station, a distance of 200 ft. The time to load	h
	parts into a tote pan at the load	
	station is 3sec per part. Each tote pan holds 8 parts, 1	'n
	addition, it takes 9sec to load a tote	
	pans onto the conveyor. Determine: (a) spacing between to	te
	pan centers flowing in the conveyor system and (b) flow ra	
	of parts on the conveyor system. (c) Consider the effect of	

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	the unit load principle. Suppose the tote pans were smaller and could hold only one part rather than eight. Determine the flow rate in this case if it takes 7 sec to load a tote pan onto the conveyor (instead of 9 sec for the larger tote pan .and it takes the same 3 sec to load the part into the tote pan.	
Q4	An automated storage/retrieval system installed in a warehouse has five aisles. The storage racks in each aisle are 30 ft high and 150fl long. The S/R machine for each aisle travels at a horizontal speed of 350 It/min and a vertical speed of 60 ft/min. The pick-and-deposit lime = $0.35$ mm. Assume that the number of single command cycles per hour is equal to the number of dual command cycles per hour and that the system operates at 75% utilization. Determine the throughput rate (loads moved per hour) of the AS/RS.	CO4
	Section C	
1. Each Question	carries 20 Marks.	
Q1	<ul><li>(a) Describe the different types of Automated guided vehicles systems.</li><li>(b) Describe the parameters of storage system performance OR</li></ul>	CO3
	A 10-aisle automated storage/retrieval system is located in an integrated factory-warehouse facility. The storage racks in each aisle are IS m high and 95 m long. The S/R machine for each aisle travels at a horizontal speed of 1.5 m/sec and a vertical speed of 0.5 m/sec. Pick-and-deposit time = 20 sec. Assume that the number of single command cycles per hour is one-hall the number of dual command cycles per hour and that the system operates at 80% utilization. Determine the throughput rate (loads moved per hour] of the AS/RS	
Q2	Describe the function and design of carousel storage system. A single carousel storage system has an oval rail loop that is 30ft long and 3ft wide .Sixty Cameras are equally spaced around the oval. Suspended from each carrier and five bins. Each bin has a volumetric capacity = $0.75$ ft <sup>3</sup> .Carousel speed = 100ft/min. Average pick-and—deposit time for a retrieval = 20 sec. Determine: (a) volumetric capacity of the storage system and (b) hourly retrieval rate of the storage system.	CO4