K.RAMAKRISHNAN
COLLEGE OF TECHNOLOGY
An Autonomous Institution
Affiliated to Anna University Chennai, Approved by AICTE New Delhi,
ISO 9001:2015 & ISO 14001:2015 Certified Institution, Accredited with 'A+' grade by NAAC
Samayapuram, Tiruchirappalli – 621 112, Tamilnadu, India.

Department of Mechanical Engineering
(NBA Accredited)

Question Bank

Semester	:	VII
Subject Code	:	OAN751
Subject Name	:	LOW COST AUTOMATION
Regulations	:	R2017
Academic Year	:	2021 – 2022
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UNIT-I : AUTOMATION OF ASSEMBLY LINES

Syllabus : Concept of automation - mechanization and automation - Concept of automation in industry - mechanization and automation - classification, balancing of assembly line using available algorithms - Transfer line-monitoring system (TLMS) using Line Status - Line efficiency - Buffer stock Simulation in assembly line.

Objectives: To give basic knowledge about automation
To understand the basic hydraulic and pneumatic systems for automation
To understand the assembly automation.

Outcomes: To give basic knowledge about automation process in industries and its efficiency calculations (K5)

PART-A

S.No.	*Questions*	*Knowledge Level*	*Competence*
1	What is automation?	K1	Remember
2	Explain Mechanization.	K2	Understand
3	Classify the automation process in detail.	K4	Analyze
4	Classify Mechanization And Automation.	K4	Analyze
5	What is the balancing of the Assembly line?	K1	Remember
6	What is a transfer line monitoring system?	K1	Remember
7	What is buffer storage?	K1	Remember
8	Write any 5 terms used in line balancing.	K3	Apply
9	Explain the term bottleneck.	K2	Understand
10	Write any four operation research technique used in line balancing.	K3	Apply
11	Explain Geneva mechanism.	K2	Understand
12	What are the basic elements of an automated system?	K1	Remember
13	Outline the objectives of Line balancing.	K2	Understand
14	Define the types of line balancing.	K1	Remember
15	What is the formula for calculating the line efficiency?	K1	Remember
16	What are the limitations of line balancing?	K1	Remember
17	What are the limitations of automation?	K1	Remember
18	List the different ways to improve line balance.	K1	Remember
19	Define line balancing.	K1	Remember

20	What is Cycle time, Lead time and Bottleneck?	K1	Remember
21	What is Task precedence, Takt time and downtime?	K1	Remember
22	List the downtime or waste activities.	K1	Remember
23	Explain an unbalanced line.	K2	Understand
24	What are the types of workpart Transport systems?	K1	Remember
25	Brief Asynchronous transfer.	K1	Remember
26	Define Starving in the production line.	K1	Remember
27	Define blocking in the production line	K1	Remember
28	Explain Fixed Automation.	K5	Evaluate
29	Define Programmable Automation.	K1	Remember
30	Illustrate an example of Flexible Automation	K2	Understand
31	List the reasons for Automation.	K1	Remember
32	List the inputs required for the manufacturing process.	K1	Remember
33	List out the principal types of plant Layout	K1	Remember
34	Classify the types of transfer mechanisms.	K2	Understand
35	Recall the types of Rotary transfer mechanisms	K1	Remember
36	Recall types of Linear transfer mechanism:	K1	Remember
37	Tell the control strategies of the automatic transfer system.	K1	Remember
38	Define Assembly and types of joining methods.	K1	Remember
39	Spell out the constraints for assembly line balancing.	K1	Remember
40	Label the benefit of line balancing.	K1	Remember

PART-B

S.No.	***Questions***	***Mapping***	
1	Explain automation briefly.	K2	Understand
2	Explain the Elements of an Automated System.	K2	Understand
3	Recall the terms and steps involved in line balancing.	K1	Remember
4	Categorize the types of Automation process.	K4	
5	Explain transfer line monitoring system.	K5	Evaluate
6	Explain in brief Continuous Transfer System and Synchronous transfer system.	K5	Evaluate
7	Explain in brief Asynchronous transfer system and Stationary base part system.	K5	Evaluate
8	Summarize functions of automation information processing in manufacturing.	K2	Understand
9	Discuss in detail about the various reasons for Automation with advantages & disadvantages.	K6	Create
10	Elaborate the different Automation Strategies followed in industry.	K6	Create
11	Identify the different inputs required for the manufacturing process and discuss their significance.	K3	Apply
12	Elaborate the importance of Plant Layout. Discuss the different plant layouts followed in the automated company.	K6	Create
13	Interpret the meaning of Linear transfer mechanism.	K2	Understand
14	Explain in detail the Rotary transfer mechanism followed in the automation process.	K5	Evaluate

15	Explain different types of linear transfer systems.	K5	Evaluate
16	Outline the different segmented in-line configuration with neat sketches.	K2	Understand
17	List & explain the various elements of the parts delivery system	K5	Evaluate
18	Elaborate the Buffer storage system with a neat sketch.	K6	
19	Compare the various control strategies to control the operation of automatic transfer systems.	K5	Evaluate
20	A transfer machine with 12 stations has an ideal cycle time of 39 seconds. The frequency of line stops is 0.085 stops per cycle. When a line stop occurs, the average downtime is 5.5 minutes. Evaluate (a) average production rate in parts per hour, (b) line efficiency, and (c) proportion downtime.	K5	Evaluate

PART-C

S.No.	*Questions*	*Mapping*	
1	An assembly consists of the following elements. Production rate required is one assembly every 20 min. Determine the minimum number of workstations required so as to minimize the balance delay. find balance delay station wise.	K5	Evaluate

Task	A	B	C	D	E	F	G	H	I	J	K	L
Predecessor	-	A	B	B	B	B	C,D	G	E	I,F	H,J	K
Task time	12	6	6	2	2	12	7	5	1	4	6	7

2	Criticize in detail about the functions of Automation in manufacturing	K5	Evaluate
3	A transfer line with 34 stations has an ideal cycle time of 0.65 minutes, an average downtime of 8.6 minutes per line stop occurrence, and a station failure frequency of 0.02 for all stations. After analysis, the system designer proposes to locate a storage buffer between stations 27 and 28 to improve line efficiency. Determine, first, the current line efficiency and production rate; and, second, the maximum possible line efficiency and production rate that would result from installing the proposed storage buffer.	K5	Evaluate
4	A 30-station transfer line has an ideal cycle time Tc=0.75 min, an average downtime Td = 6.0 min per line stop occurrence, and a station failure frequency p = 0.01 for all stations. A storage buffer is located between stations 15 and 16 to improve the line efficiency. Using the upper bound approach, determine (i) The current line efficiency and production rate. (ii) Maximum possible line efficiency and production rate because of the storage buffer.	K5	Evaluate
5	The following data apply to a 12-station in-line transfer machine: P = 0.01 (all stations have an equal probability of failure) Tc = 0.3 min Td = 3.0 min	K6	Create

	Using the lower-bound approach, Estimate the following for the transfer machine: (i) F, the frequency of line stops. (ii) Rp, the average production rate. (iii) E, the line efficiency. What proportion of work parts are removed from the transfer line?		