Code No: **R42034** **R10** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2016

AUTOMATION IN MANUFACTURING

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) What are the various types of automation? Explain them. [8]
b) What are the various pneumatic and hydraulic components used in automated industry. [7]

2 a) What are the various types of automatic loading methods used in practice and explain mechanical feeding method? [8]
b) What are the various functions involved in automation and how can they reduce cost of production? [7]

3 a) What are the various factors influence manufacturing lead time (MLT) and explain the methods to reduce transfer time? [8]
b) b) What are the objectives of use of flow lines in automation and explain various types of flow lines and their advantages? [7]

4 a) How the transfer lines are analysed in continuous and intermittent transfer machines? [8]
b) What is manual single station assembly and `manual assembly line'? Enumerate the differences between them [7]

5 a) A manual production flow line is arranged with six stations and a conveyor system is used to move parts along the line. The belt speed is 1.8 m/min and the spacing of raw workparts along the line is one for every 1.35 m. The total line length is 13.5 m, hence each station length equals 2.25 m. Determine the following [8]
i) Feed rate. ii) Tolerance time. iii) Theoretical cycle time.
b) Explain the applications of automated strong and retrieval system. [7]

6 a) Explain the various problems encountered in interfacing handling and storage systems with manufacturing units. [8]
b) What are the special features of AS/RS components? Discuss briefly. [7]

7 a) With the help of a neat block diagram, discuss the Adaptive Control with Optimization for drilling process to obtain the optimal process parameters [8]
b) Discuss the application of Adaptive Control in Machining operations. [7]

8 a) Explain the constructional features of coordinate measuring machine. [8]
b) Discuss the basic functions of machine vision system. [7]

Code No: **R42034** **R10** **Set No. 2**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2016

AUTOMATION IN MANUFACTURING

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1	a)	Enumerate the principles of automation in manufacturing industry	[8]
	b)	Enumerate the importance reasons for adopting automation by the companies with respect Indian scenario.	[7]
2	a)	What are the different methods of work part transport? Explain them.	[8]
	b)	Explain rotary transfer mechanism.	[7]
3	a)	Compare manual and automated methods of production in terms direct labour material and over head costs.	[8]
	b)	With a block diagram, explain various levels of automation.	[7]
4	a)	What is line balancing and explain largest candidate rule is adopted in Line-balancing of operations.	[8]
	b)	What is manual single station assembly and `manual assembly line'? Enumerate the differences between them.	[7]
5		A 16-station transfer line can be divided into two stages by installing a storage buffer between station 8 and 9. The probability of failure at any station is p = 0.01. The ideal cycle time is 1.0 min, and the downtime per line stop is 10.0 min.These values are both the one stage and two stage configurations. The downtime should be considered constant, and the upper bound approach should be used in the analysis. The cost of installing the storage buffer is a function of its capacity. This cost function is Cb = Rs0.6 b/hr, where b is the buffer capacity. However, the buffer can only be constructed to store increments of 10. The cost to operate the line itself is Rs120 / hr. Ignore material and tooling cost. Based on cost per unit of production, determine the buffer capacity 'b' that will minimize unit production cost..	[16]
6	a)	Discuss the features of parts classification and coding systems.	[8]
	b)	With the help of a line diagram explain the layout of a machine cell with semi integrated handling.	[7]
7	a)	What is the objective of Adaptive Control with Constraints? Draw the block diagram of a typical computerized Adaptive Control with Constraints system for drilling operation and explain in detail	[8]
	b)	Explain the three phases involved in shop floor control system.	[7]
8	a)	Explain the constructional features of coordinate measuring machine.	[8]
	b)	Discuss the basic functions of machine vision system.	[7]

Code No: **R42034** **R10** **Set No. 3**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2016

AUTOMATION IN MANUFACTURING

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1 a) Discuss the important categories of machine tool control strategies [8]
b) What are the basic elements of an automated system? Explain. [7]

2 a) List out the requirements of a plant layout for automation. [8]
b) What are the three basic control functions used in automated flow lines? Explain their features. [7]

3 a) Define the following:
i) Average production time. ii) Line efficiency iii) Cost per work piece [8]
b) Draw the neat sketches of the following mechanisms and discuss briefly
i) Rachet and Pawl mechanism. ii) `Over and Under' type chain drive mechanism [7]

4 a) Briefly explain ranked position weights method of line balancing with suitable example. [8]
b) Explain the following methods of AGUS.
i) Frequency select method. ii) Path switch select method [7]

5 A 16-station transfer line can be divided into two stages by installing a storage buffer between station 8 and 9. The probability of failure at any station is p =0.01. The ideal cycle time is 1.0 min, and the downtime per line stop is 10.0 min.These values are both the one stage and two stage configurations. The downtime should be considered constant, and the upper bound approach should be used in the analysis. The cost of installing the storage buffer is a function of its capacity. This cost function is Cb = Rs0.6 b/hr, where b is the buffer capacity. However, the buffer can only be constructed to store increments of 10. The cost to operate the line itself is Rs120 / hr. Ignore material and tooling cost. Based on cost per unit of production, determine the buffer capacity 'b' that will minimize unit production cost. [16]

6 a) Explain various reasons for using the storage buffers on the automated production lines [8]
b) Discuss the features of parts classification and coding systems. [7]

7 a) What is the objective of Adaptive Control with Constraints? Draw the block diagram of a typical computerized Adaptive Control with Constraints system for drilling operation and explain in detail [8]
b) Explain the three phases involved in shop floor control system [7]

8 a) Discuss the features of generative computer aided process planning [8]
b) Write about coordinate measuring machine and its types and benefits. [7]

Code No: **R42034** **R10** **Set No. 4**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2016

AUTOMATION IN MANUFACTURING

(Mechanical Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1 a) What are the different types of automation? Discuss them briefly. [8]
b) What are the various types of automated systems used in practice and explain their relative merits and applications [7]

2 a) Explain the fundamentals of automated production lines. [8]
b) Explain the reasons for the use of storage buffers in automation [7]

3 a) Discuss the working of Geneva mechanism used in rotational indexing motion [8]
b) In a 10-station transfer line, the probability breakdown will occur for a given work part is equal to 0.01. This probability is the same for all 10 stations. Determine the frequency of line stops per cycle on this flow line using the upper-bound approach. [7]

4 a) How the transfer lines are analyzed in continuous and intermittent transfer machines [8]
b) List out the characteristics of automated assembly systems. [7]

5 a) Explain the design principles of automated guided vehicle system. [8]
b) Explain the applications of automated strong and retrieval system. [7]

6 a) What are the benefits of automated production lines. [8]
b) Explain various reasons for using the storage buffers on the automated production lines. [7]

7 a) With the help of a neat block diagram, discuss the Adaptive Control with Optimization for drilling process to obtain the optimal process parameters [8]
b) Discuss the application of Adaptive Control in Machining operations [7]

8 a) Explain the constructional features of coordinate measuring machine [8]
b) Discuss the basic functions of machine vision system. [7]