Code No: **R42244** **R10** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

AUTOMATION IN MANUFACTURING

(Automobile Engineering)

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

Answer any FIVE Questions

All Questions carry equal marks

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1 What are the various strategies of automation? State the advantages of automation in manufacturing industry. [15]

2 a) Differentiate synchronous transport system and asynchronous transport system. [8]

b) A rotary worktable is driven by a Geneva mechanism with five slots. The driver rotates at 48 rev/min. Determine:
i) the cycle time ii) available process time and iii) indexing time each cycle. [7]

3 a) Explain various reasons for using the storage buffers on the automated production lines. [8]

b) What are two reasons for the existence of partially automated production lines. [7]

4 Explain briefly ranked position weights method of line balancing with suitable example. [15]

5 Discuss the following types of AGV's and their applications.
i) AGV's towing vehicles. ii) AGV's unit load transporters.
iii) AGV's pallet tracks [15]

6 Each aisle of a six-aisle Automated Storage/Retrieval System is to contain 50 storage compartments in the length direction and 8 compartments in the vertical direction. All storage compartments will be the same size to accommodate standard size pallets of dimensions: x = 36 in and y = 48 in. The height of a unit load z = 30 in. Using the allowances a = 6 in, b = 8 in, and c = 10 in, determine (a) how many unit loads can be stored in the AS/RS, and (b) the width, length, and height of the AS/RS. The rack structure will be built 18 in above floor level. [8]

b) Discuss the applications of AS/RS. [7]

7 With the help of a neat block diagram, discuss the Adaptive Control with Optimization for drilling process to obtain the optimal process parameters. [15]

8 a) What is concurrent engineering? What are its advantages? [8]

b) Explain working of stereolithography apparatus with neat sketch. [7]

Code No: **R42244** **R10** **Set No. 2**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

AUTOMATION IN MANUFACTURING

(Automobile Engineering)

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

Answer any FIVE Questions

All Questions carry equal marks

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1 What are the important mechanical feeding devices used in automated systems? Discuss them briefly. [15]

2 a) Discuss the control functions of automated flow lines. [10]

b) List out the benefits of automated flow lines. [5]

3 Write short notes on following:

a) Starving and Blocking

b) Applications of automated flexible line.

c) Partial automation [15]

4 A proposal has been submitted to replace a group of assembly workers, each working individually, with an assembly line. The following table gives the individual work elements.

Element	T (Minutes)	Immediate predecessors
1	1.0	----
2	0.5	----
3	0.8	1, 2
4	0.3	2
5	1.2	3
6	0.2	3, 4
7	0.5	4
8	1.5	5, 6, 7

The demand rate for this job is 1600 units/week (assume 40 h/week) and the current number of operators required to meet this demand is eight using the individual manual workers.

i) Construct the precedence diagram from the data provided on work elements.

ii) Use the largest-candidate rule to assign work elements to stations. What is the Balance delay for the solution?

iii) The initial cost to install the assembly line is Rs.20,000. If the hourly rate for workers is Rs. 5.00/h, will the assembly line be justified using a 3-year service life? Assume 50 weeks/year. Use a rate of return = 10%. [15]

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5 a) Explain various types of conveyor systems with neat sketch? [10]

b) With block diagram, Explain material handling in production system. [5]

6 Describe the following types of storage and retrieval systems.

a) Unit load AS/RS.
b) Mini load AS/RS.
c) Deep lane AS/RS. [15]

7 With the help of a neat block diagram, discuss the Adaptive Control for grinding process to obtain the optimal process parameters. [15]

8 a) Explain working principle of selective laser sintering with neat sketch. [8]

b) State the reasons for implementing Business Process Reengineering concept in various manufacturing companies. [7]

Code No: **R42244** **R10** **Set No. 3**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

AUTOMATION IN MANUFACTURING

(Automobile Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks
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1 Describe the function and working of the following automated machine tools:
i) Walking beam transfer system ii) Geneva mechanism [15]

2 a) Discuss briefly about the following terms used in automated flow lines:
i) Buffer stock effectiveness ii) Partial Automation [8]
b) Give the reasons why storage buffers are used in automated flow lines. [7]

3 a) State important factors to be considered for the design of assembly line. [6]
b) Analyze the single model assembly lines for the following performance measures:
i) Production rate ii) Line efficiency iii) The number of workers. [9]

4 a) What are the various considerations in material handling system design? Explain. [10]
b) Define mono rail, crane and hoist. [5]

5 a) What is meant by AS/RS? How is it implemented in FMS? [8]
b) Compare conventional storage systems with automated storage systems [7]

6 a) Define Adaptive control. Explain the functions of adaptive control. [7]
b) Explain Adaptive control constraints system for machining process and state their applications [8]

7 a) Discuss various difficulties encountered in carrying out concurrent engineering. [7]
b) Explain working principle of selective laser sintering with neat sketch. [8]

8 Write short notes on following: [7]
i) feeders used in factory automation ii) Types of Automation [8]

Code No: **R42244** **R10** **Set No. 4**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

AUTOMATION IN MANUFACTURING

(Automobile Engineering)

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

Answer any FIVE Questions

All Questions carry equal marks

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1 What are the various components of hydraulic circuit system? Explain the function of each component briefly. [15]

2 a) Enlist indexing assembly machine. Explain rotary indexing machine with neat Sketch. [8]

b) A rotary worktable is driven by a Geneva mechanism with five slots. The driver rotates at 48 rev/min. Determine:
a) the cycle time, b) available process time, and c) indexing time each cycle. [7]

3 An eight station rotary indexing machine operates with an ideal cycle time of 20 sec. The frequency of line stop occurrences is 0.06 stop/ cycle on the average. When a stop occurs, it takes an average of 3 min to make repairs. Cost elements associated with the operation of the ten-station transfer line are as follows: raw workpart cost = $0.55/pc, line operating cost = $42.00/hr, and cost of disposable tooling = $0.27/pc. Determine the following:
i) Average production time T_P ii) Average production rate R_p
iii) Line efficiency E iv) Proportion of downtime D.
v) The average cost of a work piece produced. [15]

4 a) State the reasons why manual assembly lines are so productive. [7]

b) Explain configuration of manual assembly line with neat sketch. [8]

5 a) What do you understand by automated guided vehicle systems? Discuss. [8]

b) Explain the quantitative relationships and analysis of conveyor systems. [7]

6 Discuss the reasons that justify the installation of automated storage system for work in process storage. [15]

7 With the help of a neat block diagram, discuss the Adaptive Control with Optimization for milling process to obtain the optimal process parameters. [15]

8 Write short notes on following:
i) Enterprise resource planning
ii) Concurrent Engineering
iii) Applications of Rapid prototyping [15]