Code No: 07A71402 **R07** **Set No. 2**

IV B.Tech I Semester Examinations,November 2010
PRODUCT DESIGN AND ASSEMBLY AUTOMATION
Mechatronics

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. List out the favourable points to be considered in automatic handling of product and explain them. [16]
2. Explain the disadvantages of automation in detail. [16]
3. (a) What is a vibratory bowl feeder.
   (b) List and explain the various parts of vibratory bowl feeding system. [6+10]
4. Derive an expression for total equipment cost and dimensionless cost of assembly per part for free transfer machines. [16]
5. Write short notes on the following.
   (a) In bowl Tooling
   (b) Out of bowl Tooling
   (c) Passive orienting device
   (d) Active orienting device. [4+4+4+4]
6. (a) What is pyramid assembly. Briefly explain it.
   (b) What are the common fastening methods used in manual assembly process and explain them with neat sketches. [8+8]
7. List out the design and fabrication considerations in automatic assembly line and Explain them. [16]
8. Explain the analysis of avoiding jams during assembly with a neat sketch. [16]

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Code No: 07A71402 **R07** **Set No. 4**

IV B.Tech I Semester Examinations,November 2010
PRODUCT DESIGN AND ASSEMBLY AUTOMATION
Mechatronics

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain the following for single station robot systems.
   (a) Personnel costs
   (b) Part quality [8+8]
2. Differentiate between design for assembly methodology and general design guide lines in assembly process. [16]
3. List out the general design guide lines for insertion and fastening ? Illustrate with Examples. [16]
4. (a) What are the various types of cams used in practice and how they can be used in transferring material from one position to the next position.
   (b) List out the advantages of cams in automation. [8+8]
5. (a) What is the effect of required feed rate on feeding cost in automatic assembly?
   (b) Calculate the feed equipment rate, if vibratory bowl feeder cost Rs 50,000 after installation and debugging , that the pay back period is 30 months with two shifts working and factory equipment overhead rate is 100%(Eo = 2). If federate is 50 parts/min, also calculate cost of feeding. [8+8]
6. (a) What is a fixed automation.
   (b) Mention the typical features of fixed automation and explain it. [8+8]
7. Explain the analysis of the Mechanics of vibratory conveying in vibratory feeder. [16]
8. (a) Sketch and explain the orienting system for right rectangular prisms.
   (b) Explain the matrices for orienting system for right rectangular prisms. [8+8]

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Code No: 07A71402 **R07** **Set No. 1**

IV B.Tech I Semester Examinations,November 2010
PRODUCT DESIGN AND ASSEMBLY AUTOMATION
Mechatronics

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Differentiate between spiral elevators and Balanced feeders.
   (b) List out the applications of balanced vibratory feeders. [8+8]
2. (a) How do you choose assembly method ? Discuss.
   (b) Explain the advantages of belt driven transfer system over chain driven transfer System. [8+8]
3. Explain the advantages and disadvantages of manual assembly data sheets in assembly process. [16]
4. Define the term total angle of symmetry. Discuss the effect of total angle of symmetry on the time required to handle a part. [16]
5. Write about advantages and disadavantages of programmable automation. [16]
6. (a) Write short notes on Magazines
   (b) Mention the advantages and disadvantages of magazines. [10+6]
7. Explain classification of first digit of geometrical classification of parts for automatic handling and mention the part features. [16]
8. Explain the robot assembly of the power plug in feasibility study for Assembly Automation. [16]

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Code No: 07A71402 **R07** **Set No. 3**

IV B.Tech I Semester Examinations,November 2010
PRODUCT DESIGN AND ASSEMBLY AUTOMATION
Mechatronics

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Sketch and explain inline- free transfer machine in automatic assembly transfer system.
   (b) What are the advantages of rack and pinion with ratchet and pawl mechanism. [8+8]

2. (a) What is the use of steady vibratory feeder?
   (b) What is an automatic feeding?
   (c) Show the limiting conditions in the analysis of vibratory conveying in graph and explain it. [4+4+8]

3. (a) How do you estimate as automatic insertion cost for a part in its insertion operations.
   (b) The standard work head costs Rs10,000 after installation and debugging , that the pay back period is 30 months with two shifts working and factory equipments overhaeads are 100%(Eo = 2). Determine the equipment rate. [8+8]

4. (a) Discuss the design data sheets for manual handling.
   (b) Discuss the design data sheets for manual insertion and fastening. [8+8]

5. Explain the precedence diagram for complete assembly of power plug and sub assemblies of power plug. [16]

6. Derive the condition for reducing disk assembly problem. [16]

7. (a) Discuss the terms used in automation
      i. Trends of labour towards the service sector.
      ii. High cost of not automating
   (b) Sketch and explain the graphs between product variety and production volume for three types of production automation as a function of production volume and product variety. [8+8]

8. Sketch and explain the construction and working of magnetic disk feeder. [16]

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