IME 408 Industrial Robotics -- Edwards

Test II

September 10, 2020

Answer the Following Questions to the Best of Your Ability – GOOD LUCK!!

SAFETY *FIRST -- AGAIN!!!!*

1) If there were an incident in the Robotics Lab which required Emergency attention, what telephone number should you call if you were to use your cell phone?

810-762-9501

b) Why THIS number??

It is campus safety, they know where the lab is rather than 911, where they would likely hesitate to know where the lab is at.

2) If you need to go into a robotic work cell, Turning the Teach Pendant "On" and taking it into a robotic work cell is a layer of safety.

True False

Why??

The teaching pendant overrides any programs loaded onto the robot and only moves via the teaching pendant

3) What are Denavit-Hartenberg (D-H) Parameters??

The parameters for a particular convention for locating a robot in space.

4) A 25% Improvement in Cycle Time yields what Level of Improvement in JPH?

A) The Same -- 25%
B) Between 20% and 25%
C) Between 25% and 30%
D) 33%
E) All The Above

IN LAB;

5) *In Lab,* There is an E-stop on the Teach Pendant and the Control Panel.

True False

6) On the teach pendent, what button clears a fault?

A) Clear
B) Reset
C) Shift
D) +J1
E) All The Above

7) On the teach pendent, what button do we hold while pressing a +J2 to move the robot?

A) Clear
B) Reset
C) Shift
D) +J1
E) None of the Above

8) What is the difference between accurate and precise??

Accuracy: close to the intended point

Precision: repetition about the same spot

b) Which are robots noted for?

Precision

9) Which robotic system would be more flexible and cost effective?

Prismatic Articulating

10) If you have a large working environment and easy access to work within it, and heavy crankshafts to move from a forging press across an aisle to a machining operation; which Robotic System might you wish to use?

Gantry cranes allow for large arms to traverse large areas. They allow for 3-dimensional movements, so it can reach down, pull the piece up as needed, and move it to the machining area.

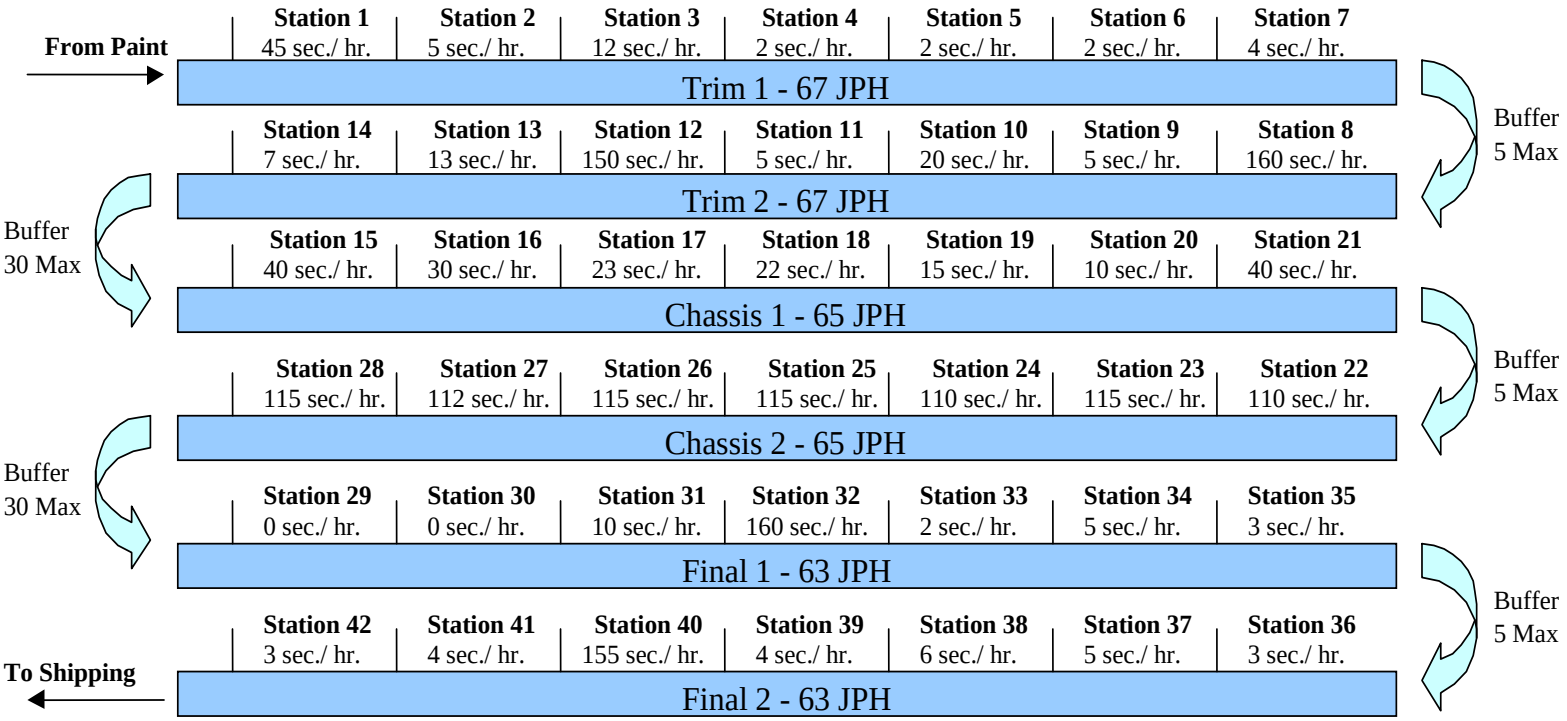
11) Ideally, a Body Shop wants to operate in _____ mode

Batch One Piece Flow

12) If the Body Shop were asked to move production from 60 to 120 Jobs per Hours, What would be the necessary improvement (%) in the Cycle Time in order to achieve this goal.

In order to double the productivity, we must cut the cycle time in half, therefore we must see a 50% improvement in cycle time.

Honolulu Assembly - TCF Layout



FOR THE FOLLOWING QUESTIONS – PLEASE REFER TO THE HOLOLULU PROJECT ABOVE!!!

13) If we automate Trim 1 and improve the SAJPH output by 20%, what percent improvement would we expect to see at the Paypoint?

Trim 1: ((59.85 - 65.55) / 65.55) * 100 = 8.7

Even though trim 1 sees an 8.7% improvement, we do not see any of it since it is not the bottleneck.

14) If we automate Chassis 2 and improve the SAJPH output by 20%, what percent improvement would we expect to see at the Paypoint?

Chassis 2: (59.85 * (final 1/2) - 50.7(50.7)) / 50.7 = 18% improvement

15) Where would be the new Bottleneck? Where would it not be??

The new bottleneck becomes final 1 and final 2 after Chassis 2 surpasses 59.85 SAJPH.

16) Why would we not see the "Full Benefit" of this potential improvement in Chassis 2?

Once Chassis 2 passes another area in its SAJPH, the other area would need to improve as well to keep up with the better version of Chassis 2.

17) What would be new SAJPH of Chassis 2??

Extra Credit

I) In the Book, "The Goal"

Who was Alex Rogo's Mentor?

Jonah.

II) What are Isaac Asimov's 3 Laws of Robotics?

1) A robot may not injure a human being or, through inaction, allow a human being to come to harm.

2) A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.

3) A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.