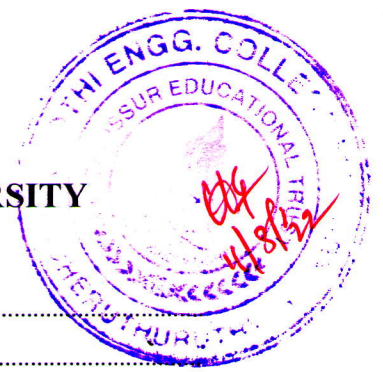


APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER



Q. Paper: IAR0822242-I

(Pages: 2)

Name:

Reg. No:

SECOND SEMESTER M.TECH. DEGREE EXAMINATION JULY 2022

Branch: Mechanical Engineering

Specialization: Industrial Automation & Robotics

08ME6342(B)ROBOTICS BASED INDUSTRIAL AUTOMATION

Time: 3 Hours

Max. Marks: 60

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q. No.	Module 1	Marks
1.a	Define automation and list types of automation.	3

Answer b or c

b	Explain different strategies of automation and process implementations.	6
c	Discuss low-cost automation with suitable example.	6

Q. No.	Module 2	Marks
2.a	Define partial automation and its role in the manufacturing industry.	3

Answer b or c

b	Explain the analysis of transfer lines with storage buffers.	6
c	A 30 station transfer line is being proposed to machine a certain component currently produced by conventional methods. The proposal received from the machine tool builder states that the line will operate at a production rate of 100 pcs/hr at 100% efficiency. From a similar transfer line, it is estimated that breakdowns of all types will occur at a frequency of $F = 0.20$ breakdowns per cycle & that the average downtime per line stop will be 8.0 minutes. The starting blank that is machined on the line costs Rs. 5.00 per part. The line operates at a cost for 100 parts each & the average cost per tool = Rs. 20 per cutting edge.	6

Compute the following: (i) Production rate (ii) Line efficiency (iii) Cost per unit piece produced on the line

Q. No.	Module 3	Marks
3.a	Define line balancing. List the methods of line balancing.	3

Answer b or c

- b** The following tasks must be performed on an assembly line in the sequence and times specified in the table. **6**

Task	A	B	C	D	E	F	G	H
Task time(s)	55	45	25	50	25	30	15	40
Predecessor	-	-	A	C	C	D	E	B, F, G

- (i) What is the theoretical no of stations required to meet a forecast demand of 500 units per 8-hour day? (ii) Use the longest task time rule and balance the line in the minimum no of stations to produce 500 units per day. (iii) Find the efficiency.

- c** Explain different types of automated assembly systems. **6**

Q. No. **Module 4** **Marks**

- 4.a** List the factors influencing the selection of material handling systems. **3**

Answer b or c

- b** Explain the different types of material handling systems with neat sketches. **6**
- c** Discuss the design of conveyer systems and AGVs **6**

Q. No. **Module 5** **Marks**

- 5.a** List and explain the types of storage systems. **4**

Answer b or c

- b** Explain with neat sketches types of AS/RS systems and their applications. **8**
- c** Explain the design of carousel storage systems. **8**

Q. No. **Module 6** **Marks**

- 6.a** What do you mean by automated inspection? Enlist the steps involved in automation of an inspection procedure in an industry. **4**

Answer b or c

- b** Describe the different parts of a coordinate measuring machine. Enlist the applications of CMMs. **8**
- c** Explain the role of performance modelling in automated inspection and testing. Discuss the various performance modelling tools. **8**