Roll No.													

PRESIDENCY UNIVERSITY
BENGALURU
SCHOOL OF ENGINEERING

TEST 1

Sem & AY: Odd Sem. 2019-20

Course Code: MEC 302

Course Name: COMPUTER INTEGRATED MANUFACTURING

Program & Sem: B.Tech (MEC) & VII DE

Date: 30.09.2019

Time: 9:30AM to 10:30AM

Max Marks: 40

Weightage: 20%

Instruction:

(i) Read the question properly and answer accordingly.

(ii) Question paper consists of 3 parts.

(iii) Scientific and Non-programmable calculators are permitted.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries four marks. (3Qx4M=12M)

1. Write a short note on a) Fixed Automation b) Programmable Automation. (C.O.NO.1) [Knowledge]
2. List out the benefits of Computer integrated manufacturing (C.O.NO.1) [Knowledge]
3. What are the objectives of Transfer line in automation system? (C.O.NO.1) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries six marks. (3Qx6M=18M)

4. With simple sketch explain the In-line (Straight line) configuration in automated flow line system with example. (C.O.NO.2) [Comprehension]
5. What for Rack and Pinion mechanism is used in automated flow line? Explain with line diagram. (C.O.NO.2) [Comprehension]
6. A product machine operates 96hr/week (2 shifts, 6days) at full capacity to production rate is 24 units/hr. During a certain week, the machine produced 1200 parts and was idle in the remaining time.
   i) Determine the production capacity of the machine
   ii) What was the utilization of the machine during the week?
   (C.O.NO.2) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries ten marks. (1Qx10M=10M)

7. Explain the any five elements of computer Integrated Manufacturing system. (C.O.NO.2) [Comprehension]

SCHOOL OF ENGINEERING

GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS

Semester:

Course Code: MEC 302

Course Name:COMPUTER INTEGRATED MANUFACTURING

Date: 30/9/2019

Time: 9:30 to 10:30

Max Marks: 40

Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1	1	1	4									4
2	1	1	4									4
3	1	2	4									4
4	2	2				6						6
5	2	2				6						6
6	2	1					6					6
7	2	1						10				10
	Total Marks											40

K =Knowledge Level C = Comprehension Level, A = Application Level

: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

[I hereby certify that All the questions are set as per the above guide lines. Mr. Aravinda T]

Reviewers' Comments

Annexure- II:

SCHOOL OF ENGINEERING

GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS

SOLUTION

Semester: VII

Course Code: MEC302

Course Name: COMPUTER INTEGRATED MANUFACTURING

Branch & Sem: B.Tech VII

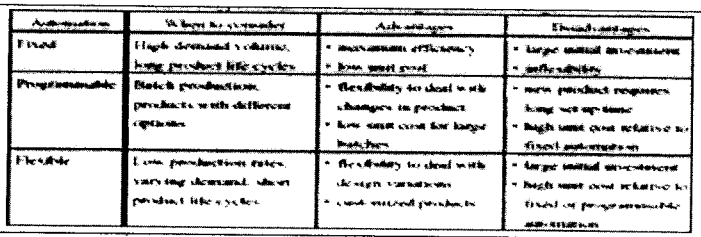
Date: 30/9/2019

Time: 9;30 TO 10:30

Max Marks: 40

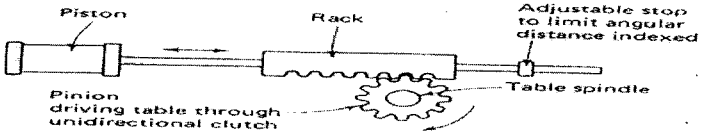
Weightage: 20%

Part A (3Q x 4M = 12Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Questior
1		2 x 2 =4M	4 Min
2	1. Creation of a truly *interactive system* that enables manufacturing functions to communicate easily with other relevant functional units 2. Accurate data transferability among manufacturing plant or subcontracting facilities at implant or diverse locations 3. Faster responses to data-changes for manufacturing flexibility 4. Increased flexibility towards introduction of new products 5 Improved accuracy and quality in the manufacturing process 6. Improved quality of the products. 7. Control of data-flow among various units and maintenance of user-library for system-wide data. 8. Reduction of lead times which generates a competitive advantage. 9. Streamlined manufacturing flow from order to delivery. 10. Easier training and re-training facilities	1 x4=4M	4 Min
3	➢ To reduce labor costs ➢ To increase production rates ➢ To reduce work-in-process ➢ To minimize distances moved between operations ➢ To achieve specialization of operation	1 x 4=4M	2 Min

	➢ To achieve integration of operations		

Part B (3Q x 6M = 18Marks)

Q No	Solution	Scheme of Marking	Max. Time required for eac Question
4	The *in-line configuration consists of a sequence of workstations in a more-or-less* straight-line arrangement. ➢ This configuration is common for machining big work pieces, such as automotive engine blocks, engine heads and transmission cases. ➢ Because these parts require a large number of operations, a production line with many stations is needed. ➢ The in-line configuration can accommodate a large number of stations. ➢ In-line systems can also be designed with integrated storage buffers along the flow path.	Sketch:2m Explaination:4M=6m	6 Min
5	➢ This mechanism is simple but is not considered especially suited to the high-speed operation often associated with indexing machines. ➢ It uses a piston to drive the rack, which causes the pinion gear and attached indexing table to rotate, A clutch or other device is used to provide rotation in the desired direction 	Sketch 2 M Explanation 4 M	6 Min
6	nSH=96hr/wk, Rp=24 units/hr Q=1200 Pc= nSHRp=96 x 24 =2304 units/wk U=q/Pc=1200/2304=52.08%	PC=4M U=2M	6 Min

Part C (1Q x 10M = Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
7	○ Marketing ○ Product Design ○ Planning & Purchase ○ Manufacturing Engineering ○ Factory Automation Hardware	2 x 5=10M	12 Min

	○ Warehousing ○ Logistics and Supply Chain Management ○ Finance ○ Information Management		

Roll No.												

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST – 2

Sem & AY: Odd Sem 2019-20
Course Code: MEC 302
Course Name: COMPUTER INTEGRATED MANUFACTURING
Program & Sem : B.Tech (MEC) & VII (DE)

Date: 18.11.2019
Time: 9:30 AM to 10:30 AM
Max Marks: 40
Weightage: 20%

Instruction:

(i) Read the question properly and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and Non-programmable calculators are permitted.

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries four marks. (3Qx4M=12M)

1. What is cellular manufacturing? List out the objectives (C.O.NO.3) [Knowledge]
2. What are the functions of selector and orientor in automated assembly line system. (C.O.NO.2) [Knowledge]
3. Write a short note on Hybrid structure used in group technology. (C.O.NO.3) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each Question carries six marks. (3Qx6M=18M)

4. With simple sketch explain the Open field type layout used in FMS system (C.O.NO.3) [Comprehension]
5. Explain the MICLASS coding system with structure. (C.O.NO.3) [Comprehension]
6. Explain the Group or Combination layout using group technology with neat sketch. (C.O.NO.3) [Comprehension]

Part C [Problem Solving Questions]

Answer the Question. The Question carry ten marks. **(1Qx10M=10M)**

7. Apply the rank order clustering technique to the part-machine matrix in the following table to identify logical part families and machine group. Parts are identified by numbers and machine by letters. (C.O.NO.3) [Application]

	Parts					
Machine	**1**	**2**	**3**	**4**	**5**	**6**
A		1		1		
B	1		1		1	1
C		1	1	1		1
D	1				1	1
E				1	1	

SCHOOL OF ENGINEERING

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

Semester:

Course Code: MEC 302

Course Name:COMPUTER INTEGRATED MANUFACTURING

Date: 18.11.2019

Time: 9:30 to 10:30 Am

Max Marks: 40

Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1	3	3	4									4
2	2	2	4									4
3	3	3	4									4
4	3	3				6						6
5	3	3				6						6
6	3	3					6					6

7	3	3							10			10
	Total Marks											40

K =Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

PAnnexure- II:

SCHOOL OF ENGINEERING

SOLUTION

GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS

Semester: VII

Course Code: MEC302

Course Name: COMPUTER INTEGRATED MANUFACTURING

Branch & Sem: B.Tech VII

Date:18.11.2019

Time: 9:30 Am to 10:30 AM

Max Marks: 40

Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1	3	3	4									4
2	2	2		4								4
3	3	3		4								4
4	3	3				6						6
5	3	3				6						6
6	3	3					6					6
7	3	3							10			10
	Total Marks											40

K =Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

Annexure- II:

SCHOOL OF ENGINEERING

SOLUTION

GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS

Semester: VII

Course Code: MEC302

Course Name: **COMPUTER INTEGRATED MANUFACTURING**

Branch & Sem: B.Tech VII

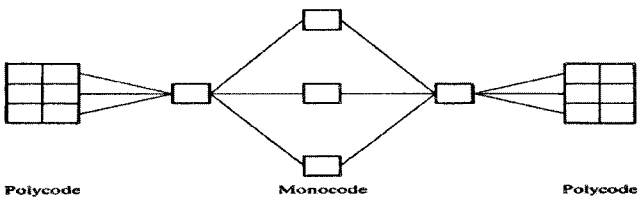
Date: 18.11.2019

Time: 9:30 AM to 10:30 AM

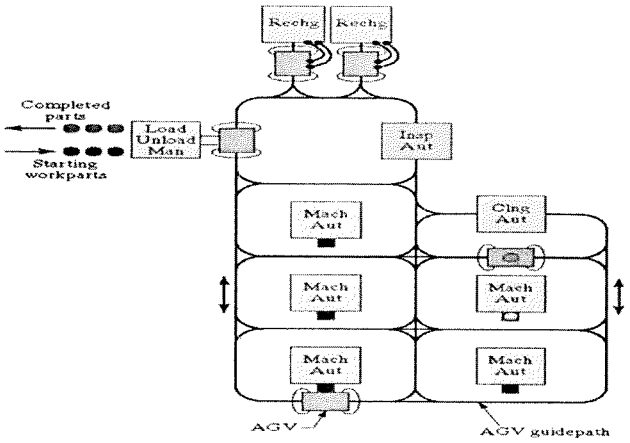
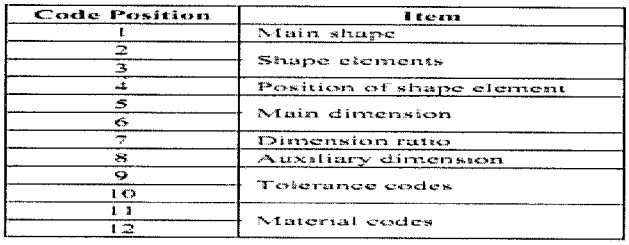
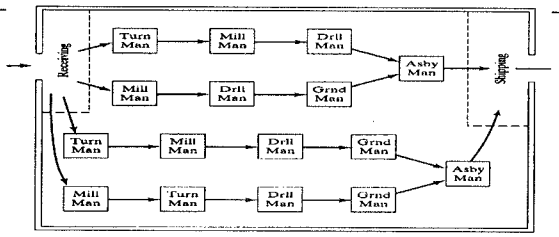
Max Marks: 40

Weightage: 20%

Part A (Q x M = Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	Application of group technology in which dissimilar machines or processes are aggregated into cells, each of which is dedicated to the production of a part family or limited group of families Typical objectives of cellular manufacturing: • To shorten manufacturing lead times • To reduce WIP • To improve quality • To simplify production scheduling • To reduce setup times	**2 + 2 =4M**	**4 Min**
2	➢ Selector ▪ Acts as a filter ▪ Only parts in proper orientation are allowed to pass through to feed track ➢ Orientor ▪ Allows properly oriented parts to pass ▪ Reorients parts that are not properly oriented	**2+2=4M**	**4 Min**
3	• Construction to combine the best features of monocodes and polycodes • Best examples of a hybrid code is the opitz code and classification system  	**2explaination+2 stucture=4M**	**4 Min**

Part B (Q x M = Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
4		Shketch:3M Explaination 3M:6M	8 Min
5	• It stands for **M**etal **I**nstitute **C**lassification system and developed by Netherlands Organization for Applied Scientific research. It is referred as Multiclass system. • MICLASS classification range from 1 to 30 digits. • the first 12 digits - Universal code that can be applied to any part • next 18 digits Specific to the particular company or industry are Supplementary code 	2 Stucture+4M Explaination=6	6 Min
6		3+3=6	8 Min

Code Position	Item
1	Main shape
2	Shape elements
3	
4	Position of shape element
5	Main dimension
6	
7	Dimension ratio
8	Auxiliary dimension
9	Tolerance codes
10	
11	Material codes
12	

Part C (Q x M = Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question

7		Rows-4M,Column 4M Grouping:2M	12 Min

	part						
machine	*1*	*2*	*3*	*4*	*5*	*6*	
A	-	1	-	1	-	-	
B	1	-	1	-	1	1	
C	-	1	1	1	-	1	
D	1	-	-	-	1	1	
E	-	-	-	1	1	-	
2^x	*32*	*16*	*8*	*4*	*2*	*1*	

	part						
machine	*1*	*2*	*3*	*4*	*5*	*6*	2^x
B	1	-	1	-	1	1	*16*
D	1	-	-	-	1	1	*6*
C	-	1	1	1	-	1	*4*
A	-	1	-	1	-	-	*2*
E	-	-	-	1	1	-	*1*
value							

	part					
machine	*6*	*5*	*1*	*3*	*4*	*2*
B	1	1	1	1	-	-
D	1	1	1	-	-	-
C	1	-	-	1	1	1
A	-	-	-	-	1	1
E	-	1	-	-	1	-

Roll No.												

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST – 2

Sem & AY: Odd Sem 2019-20
Course Code: MEC 305
Course Name: PRODUCT DESIGN & DEVELOPMENT
Program & Sem: B.Tech (MEC) & VII

Date: 18.11.2019
Time: 9:30 AM to 10:30 AM
Max Marks: 40
Weightage: 20%

Instructions:

(i) ***Read Questions Carefully and Answer accordingly***

Part A [Memory Recall Questions]

Answer both Questions. Each Question carries four marks **(2Qx4M=8M)**

1. How Product Architecture is different from Product Design. Explain with a suitable example. (C.O.NO.2)[Knowledge]

2. Define Concept selection keeping in view the Concept Generation process.

(C.O.NO.3)[Knowledge]

Part B [Thought Provoking Questions]

Answer both the Questions. Each Question carries six marks **(2Qx6M=12M)**

3. KIA motors India is planning for a new **dashboard design** for their upcoming Electric vehicle in India. Suggest a technique that can improve the design of dashboard to make it more Aesthetic and Ergonomic. Also explain the tool suggested.

(C.O.NO.2)[Comprehension]

4. Carrier midea is an Air Conditioner manufacturing company and it has listed the following Data. The **severity** of a compressor failure in an Air Conditioner is marked as 9, **occurrence** of the listed failure is given in the scale as 8 and the magnitude of **detection** parameter is listed as 9. Calculate RPN and also suggest the changes based on RPN on Compressor design.

(C.O.NO.2) [Comprehension]

Part C [Problem Solving Questions]

Answer both the Question. Each Question carries ten marks. (2Qx10M=20M)

5. Explain in detail the Failure Mode and Effect Analysis (FMEA) and also write the one mathematical model which helps in FMEA analysis.

(C.O.NO.2) [Application]

6. Explain in Detail how the Modular design concept is useful to any industry and illustrate with example what do you understand by Slot, Bus and Sectional Modular design.

(C.O.NO.2) [Application]

SCHOOL OF ENGINEERING

Semester: 7 Sem

Course Code: MEC 305

Course Name: Product Design & Development

Branch & Sem: B.Tech & 7th Sem

Date: 18 NOV 2019

Time: 9:30- 10:30 am

Max Marks: 40

Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1	C.O.02	Module 2		4	K							4 marks
2	C.O.03	Module 3		4	K							4 marks
3	C.O.02	Module 2					6	C				6 marks
4.	C.O.02	Module 2					6	C				6marks
5	C.O.02	Module 2								10	A	10 marks
6	C.O.02	Module 2								10	A	10 marks
	Total Marks	40 marks		8			12			20		40 marks

K =Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all type of questions the general guidelines is that about 60% of the questions must be such that even a below average students must be able to attempt, about 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only bright students must be able to attempt.

[I hereby certify that all the questions are set as per the above guidelines. Mr. Sreenivas H T]

Reviewer's Comments

SCHOOL OF ENGINEERING

SOLUTION

Semester: 7 Semester
Course Code: MEC 305
Course Name:Product Design & Development
Branch & Sem: B.Tech & 7th Sem

Date: 18 NOV 2019
Time: 9:30-10:30 am
Max Marks: 40
Weightage: 20%

Part A (2Q x 4M = 8 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1.	Product architecture is defined as the technique to improve the overall quality of product and modify the product in terms of small modification by without defining the dimension of the product, the architecture is defined in terms of modification or changes but it does not take into account the parameter of dimension. It is different from Product design in the form as it does not: • Take into account the forces acting on the component to be designed. • It does not consider the physical dimension into consideration. • Design is a decision making process and architecture is a decision enhancing process.	**1 marks for definition and 3 marks for difference.**	**5 minutes**

2.	• Product architecture gives a prompt solution to small and minute changes. **CONCEPT SELECTION:** Product concept selection is a decision process, in which the design team selects one or a few product concept for further development. • External decision – By use of an external group of customers, clients, etc. • Product champion & intuition – By an influential member of the development team • Multi-voting – Asking each member to pick a number of concepts and pick the one with most votes. • Pros and cons – The team list the strengths and weakness of each concept. • Prototype and test – Build and test prototype for each concept and select based on the test data. • Decision metrics – The team rates each concept against selection criteria with varying importance/weights.	**2 marks for each correct definition.**	**5 Minutes**

Part B (2Q x 6M = 12 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
3.	The tool used is MODULAR DESIGN and it into account the ergonomic and aesthetic design. • Modularization is currently in focus as a means for increasing competitiveness of industrial companies. • This is achieved by bridging the advantages of standardization and rationalization with customization and flexibility. • But the phenomenon behind modularization itself is not very well described and understood in literature. In this paper, the evolution of the concept behind modularization is described in a historical perspective as a starting point for descriptions of the nature of modular systems.		

	• This leads to definitions of the terms: module, modularity, and modularization. • Modularization is often mentioned as a means for handling these seemingly conflicting demands - and frequently in connection with the manufacturing concept of mass customization. • The idea is that a broad variety of products can be produced by combining a limited number of modules. In this way modularity balances standardization and rationalization with customization and flexibility. • Furthermore, better structuring and handling of tasks and knowledge are often mentioned as advantages.	1 marks for each correct step and 6 marks for all correct steps.	8 Minutes
4.	**RPN (RISK PRIORITY NUMBER)** "RPN" is a numerical ranking of the risk of each potential failure mode/cause, made up of the arithmetic product of the three elements: □ severity of the effect □ likelihood of occurrence of the cause □ likelihood of detection of the cause. **RPN=S X O X D** Given, Severity= 9 Occurrence= 8 Detection= 9 So, RPN= 9 X 8 X 9 RPN= 648 Taking miscellaneous into account RPN becomes 64.8	2 marks for RPN and 4 marks for RPN calculation and conclusion.	8 Minutes

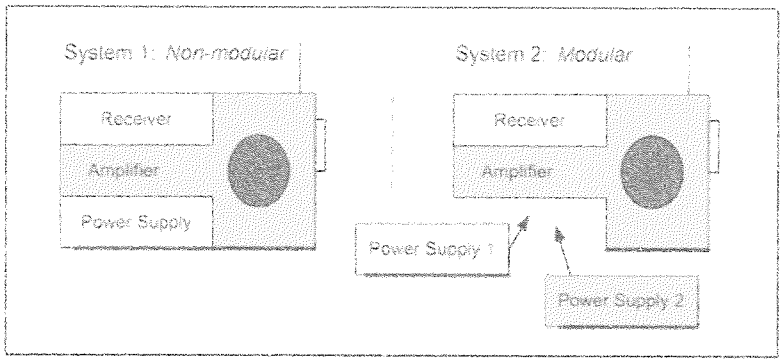
	As it falls between 60-80. So it is suggested to redesign the compressor and with taking into account the Robust design.		

Part C (2Q x 10M = 20 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
5.	**FAILURE MODE AND EFFECT ANALYSIS** Failure Mode and Effects Analysis (FMEA) is a method designed to: • Identify and fully understand potential failure modes and their causes, and the effects of failure on the system or end users, for a given product or process. • Assess the risk associated with the identified failure modes, effects and causes, and prioritize issues for corrective action. • Identify and carry out corrective actions to address the most serious concerns. An FMEA is an engineering analysis • done by a cross-functional team of subject matter experts • that thoroughly analyzes product designs or manufacturing processes **SEVERITY;** "Severity" is a ranking number associated with the most serious effect for a given failure mode based on the criteria from a severity scale. a relative ranking within the scope of the specific FMEA determined without regard to the likelihood of occurrence or detection. **OCCURRENCE:** "Occurrence" is a ranking number associated with the likelihood that the failure mode and its associated cause will be present in the item being analyzed. For System and Design FMEAs, consider the likelihood of occurrence during the design life of the product. For Process FMEAs consider the likelihood of occurrence during production. based on the criteria from the corresponding occurrence scale. has a relative meaning rather than absolute value, determined without regard to the severity or likelihood of detection. **DETECTION:**	**2 marks for fmea explanation and 2 marks each for each point explanation.**	**15 Minutes**

	"Detection" is a ranking number associated with the best control from the list of detection-type controls, based on the criteria from the detection scale. considers the likelihood of detection of the failure mode/cause, according to defined criteria. a relative ranking within the scope of the specific FMEA determined without regard to the severity or likelihood of occurrence. **RPN (RISK PRIORITY NUMBER)** "RPN" is a numerical ranking of the risk of each potential failure mode/cause, made up of the arithmetic product of the three elements: □ severity of the effect □ likelihood of occurrence of the cause □ likelihood		
6.	Modularization is currently in focus as a means for increasing competitiveness of industrial companies. This is achieved by bridging the advantages of standardization and rationalization with customization and flexibility. But the phenomenon behind modularization itself is not very well described and understood in literature. In this paper, the evolution of the concept behind modularization is described in a historical perspective as a starting point for descriptions of the nature of modular systems. This leads to definitions of the terms: module, modularity, and modularization. Modularization is often mentioned as a means for handling these seemingly conflicting demands - and frequently in connection with the manufacturing concept of mass customization. The idea is that a broad variety of products can be produced by combining a limited number of modules. In this way modularity balances standardization and rationalization with customization and flexibility. Furthermore, better structuring and handling of tasks and knowledge are often mentioned as advantages. **TYPES OF MODULARITY:** 1) **SLOT MODULARITY:** Each of the interface between the chunks in a slot modular architecture is of different type from the others so that various chunks in the product cannot be interchanged. Small changes in design are accommodated in the slot modular design part with only minor changes. 2) **BUS MODULARITY:** In a bus modularity there is a common bus to which the other chunks connect via the same type of interface non electronic products can be made by a common bus which leads to slight modifications. 3) **SECTIONAL MODULARITY:** in sectional modularity all the chunks are of same type but there is no single element to which all the	**2 marks for explanation and 2 marks each for types of modularity with diagram.**	**15 Minutes**

other chunks are connected. The assembly is made by connecting the chunks.



Roll No												

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Semester: Odd Semester: 2019 - 20
Course Code: MEC 302
Course Name: COMPUTER INTEGRATED MMANUFACTURING
Program & Sem: B.Tech (MEC) & VII (DE-IV)

Date: 24 December 2019
Time: 9:30 AM to 12:30 PM
Max Marks: 80
Weightage: 40%

Instructions:
(i) Read the all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts
(iii) Scientific and Non-programmable calculators are permitted

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries 4 marks. (5Qx4M=20M)

1. What are the reasons for implementing automation. (C.O.No.1) [Knowledge]
2. What is function of Escape and placement device. (C.O. No.2) [Knowledge]
3. Write a short note on part classification and coding method (C.O. No.3) [Knowledge]
4. What are the features of CNC machine. (C.O. No.4) [Knowledge]
5. List out the advantages of computer aided process planning (CAPP) system. (C.O. No.5) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each Question carries 6 marks. (5Qx6M=30M)

6. Explain how fixed automation is different from programmable automation. (C.O.No.1) [Comprehension]
7. With the aid of simple sketch, explain the Rachet and Pawl mechanism used in automated flow system. (C.O.No.2) [Comprehension]
8. What is the difference between single station assembly cell and Multi-station assembly machines (C.O.No.2) [Comprehension]
9. Explain the DCLASS coding system used in group technology. (C.O.No.3) [Comprehension]
10. With the help of neat sketch explain the variant approach of CAPP system. (C.O.No.5) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Each Question carries 10 marks. **(3Qx10M=30M)**

11. Write the programme in absolute system for the diagram given below for face milling operation with diameter of milling cutter tool as 100 mm, spindle speed 1000 rpm, feed is 10mm/min and depth of cut is 10mm. All the dimensions are in mm as mentioned in Fig 1. (C.O.No.4) [Application]

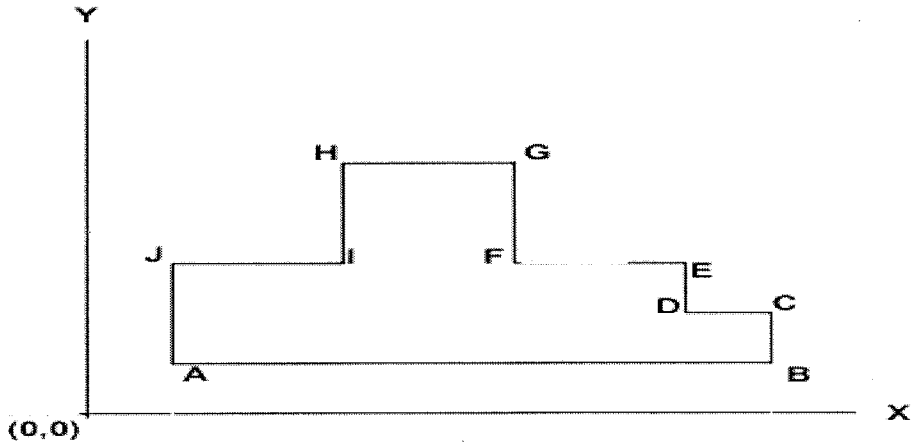


FIG.1

12. Apply the rank order clustering technique to the part-machine matrix in the following table to identify logical part families and machine group. Parts are identified by numbers and machine by letters. (C.O.No.3) [Application]

	Parts					
Machine	**1**	**2**	**3**	**4**	**5**	**6**
A		1		1		
B	1		1		1	1
C		1	1	1		1
D	1				1	1
E				1	1	

13. With neat sketch, explain the role of process planning in CAD/CAM integration. (C.O.No.5) [Comprehension]

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO (% age of CO)	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels	Thought provoking type [Marks allotted] Bloom's Levels	Problem Solving type [Marks allotted]	Total Marks
			K	C	A	
1	CO.01	UNIT-1	4			
2	CO.01	UNIT-2	4			
3	CO.01	UNIT-3	4			
4	CO.01	UNIT-4	4			
5	CO.01	UNIT-5	4			
6	CO.01	UNIT-1		6		
7	CO.02	UNIT-2		6		
8	CO.02	UNIT-2		6		
9	CO.03	UNIT-3		6		
10	CO.05	UNIT-5		6		
11	CO.04	UNIT4			10	
12	CO.03	UNIT-3			10	
13	CO.05	UNIT-5		10		
	Total Marks		20	40	20	

K =Knowledge Level C = Comprehension Level, A = Application Level

I hereby certify that all the questions are set as per the above guidelines.

Faculty Signature:

Reviewer Commend:

SCHOOL OF ENGINEERING

SOLUTION

Semester: Odd Sem. 2019-20
Course Code: MEC 302
Course Name:COMPUTER INTEGRATED MANUFACTURING
Program & Sem: B.Tech (MEC) & VII (DE-IV)

Date: 24.12.2019
Time: 3 HRS
Max Marks: 80
Weightage: 40%

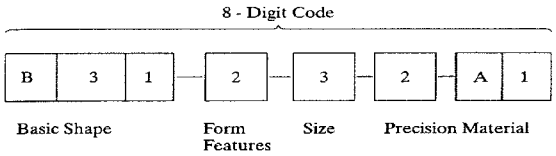
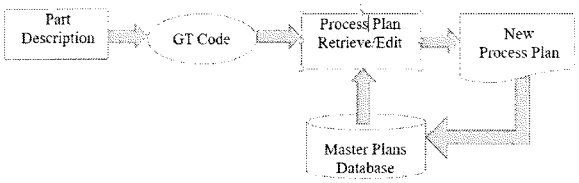
Part A (5Q x 4M = 20Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	1. To reduce labor cost 2. To mitigate the effects of labor shortages 3. To reduce or remove routine manual and clerical tasks 4. To improve worker safety 5. To improve product quality 6. To reduce manufacturing lead time 7. To accomplish what cannot be done manually 8.To avoid the high cost of not automating	**0.5 x 8=4**	**4 Min**
2	Escapement device : Removes parts from feed track at time intervals that are consistent with the cycle time of the assembly workhead Placement device: Physically places the parts in the correct location at the assembly workstation Escapement and placement devices are sometimes the same device, sometimes different devices	**2 + 2=4**	**4 Min**
3	In parts classification and coding,similarities among parts are identified, and these similarities are related in a coding system. Two categories of part similarities can be distinguished: ***1.Design attributes,*** which concerned with part characteristics such as geometry, size and material. (Basic external and internal shape Rotational or rectangular shape, L/D ratio, Aspect ratio, Dimensions and Tolerances) ***2.Manufacturing attributes,*** which consider the sequence of processing steps required to make a part.(Major processes, Minor operations, Operation sequence, Dimension, Surface finish, Machine tool Production cycle time)	**Explaination 4 Marks**	**5 Min**
4	• Storage of more than one part program • Various forms of program input • Program editing at the machine tool • Fixed cycle and programming subroutines. • Interpolation • Positioning features for setup	**0.5 x 8=4M**	**4 Min**

	• Cutter length and size compensation • Acceleration and deceleration calculation Communication interface • Diagnostic		
5	• Process rationalization and standardisation • Productivity improvement • Product cost reduction • Elimination of human error • Reduction in time • Reduced paper work • Faster response • Improved legibility	**0.5 x 8=4m**	**4 Min**

Part B (5Q x 6M = 30 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
6	Fixed Automation: A manufacturing system in which the sequence of processing (or assembly) operations is fixed by the equipment configuration. Typical features: • Suited to high production quantities • High initial investment for custom-engineered equipment • High production rates • Relatively inflexible in accommodating product • variety Programmable Automation: A manufacturing system designed with the capability to change the sequence of operations to accommodate different product configurations Typical features: • High investment in general purpose equipment • Lower production rates than fixed automation • Flexibility to deal with variations and changes in product configuration • Most suitable for batch production • Physical setup and part program must be changed between jobs (batches)	3+3=6M	15 Min
7	➢ A ratchet is a device that allows linear or rotary motion in only one direction, while preventing motion in the opposite direction. ➢ Ratchets consist of a gearwheel and a pivoting spring loaded finger called a pawl that engages the teeth. ➢ Either the teeth, or the pawl, are slanted at an angle, so that when the teeth are moving in one direction, the pawl slides up and over each tooth in turn, with the spring forcing it back with a 'click' into the depression before the next tooth.	Sketch:2 M, Explaination:4M	15 Min

	When the teeth are moving in the other direction, the angle of the pawl causes it to catch against a tooth and stop further motion in that direction. 		
8	▪ Multi-station assembly machine or line ▪ Faster cycle rate ▪ High production quantities ▪ More operations possible ▪ More components per assembly ▪ Single-station assembly cell ▪ Suited to robotic assembly ▪ Intended for lower production quantities ▪ Less space area available ▪ Low investment	3 +3=6M	12 Min
9	DCLASS Stands for Design and Classification Information System It was developed at Brigham Young University The DCLASS part family code is comprised of eight digits partitioned into five code segments 		12 Min
10		Sketch:2 M, Explaination:4M	15 Min

Part C (3Q x 10M = 30Marks)

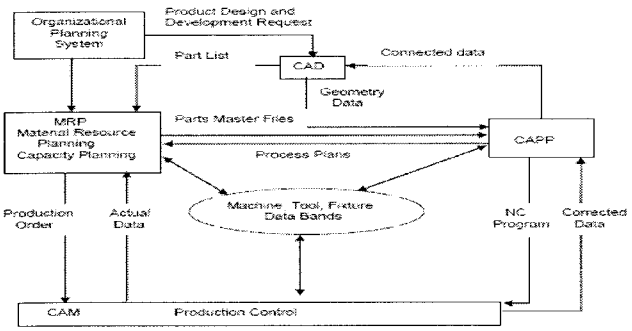
Q No	Solution	Scheme of Marking	Max. Time required for each Question
11	N01 G90 G21 X0 YO Z0 S1000 F 10 M03 NO2 G42 D10 NO3 G01 X80 Y1O Z10 NO4 G03 X80 Y 20 N05 G01 X 70 Y 20 NO6 G03 X 70 Y 20 NO7 G01 X 50 Y 20 N08 G01 X50 Y 40 NO9 G01 X 30 Y 40 N10 G01 X 30 Y 20 N11 G01 X 10 Y 20 N12 G01 X 10 Y 10 N13 G01 X0 Y 0		20 Min

	N14 G00 X0 YO Z0 N15 M40		
12			20 min

	Parts					
Machine	**1**	**2**	**3**	**4**	**5**	**6**
A		1		1		
B	1		1		1	1
C		1	1	1		1
D	1				1	1
E				1	1	

	part						
machine	*1*	*2*	*3*	*4*	*5*	*6*	2^x
B	1	-	1	-	1	1	*16*
D	1	-	-	-	1	1	*6*
C	-	1	1	1	-	1	*4*
A	-	1	-	1	-	-	*2*
E	-	-	-	1	1	-	*1*
value							

	part					
machine	*6*	*5*	*1*	*3*	*4*	*2*
B	1	1	1	1	-	-
D	1	1	1	-	-	-
C	1	-	-	1	1	1
A	-	-	-	-	1	1
E	-	1	-	-	1	-

13		Sketch4 M + Explaination:6M	20 Min