Date: 15/05/2017. Student Exam. No._____

GANPAT UNIVERSITY

B.TECH. SEM. VIII[TH] MECHATRONICS ENGINEERING

CBCS REGULAR EXAMINATION MAY/JUNE-2017 EXAMINATION

2MC802 COMPUTER INTEGRATED MANUFACTURING

Time: 3 Hrs] [Total Marks: 70

Instructions:-

1. Attempt **all** Questions.
2. Figure to the **right** indicate full marks.
3. Answers to the two section must be written in **separate** drawing papers
4. Assume suitable data if **necessary**.
5. Draw neat sketch wherever essential.
6. Programming codes (G and M Codes) are given at the end of paper

SECTION – I

Q.1 (A) What are the objectives of CIM? Which major functional areas of the Manufacturing enterprise considered for achieving CIM objectives? **(4)**

(B) What is requirement of Database management system in CIM? **(4)**

(C) Explain the Pocket identification in generative type CAPP system. **(4)**

OR

Q.1 (A) Explain the variant type CAPP system. State the benefits and limitations of variant type CAPP systems. **(4)**

(B) Elaborate the role of elements of CIM with the help of CIM wheel. **(4)**

(C) Explain the 10 principles of material handling. **(4)**

Q.2 (A) Four machines will constitute a GT cell. The from–to data for the machine are as follows. **(5)**

TO	FROM			
	1	**2**	**3**	**4**
1	0	5	0	25
2	30	0	0	15
3	10	40	0	0
4	10	0	0	0

(*i*) Determine the sequence of machine according to/from ratio

(*ii*) Construct a flow diagram

(*iii*) Where do the parts enter cell and exit the cell. 50 parts enter at machine 3, 20 parts after machine 1 leaves and 30 parts after machine 4 leaves.

(B) What is an AGV? What are different types of AGVs? What are the benefits of using AGVs? **(6)**

OR

Q.2 (A) What is PFA? Apply the rank order clustering technique to the part-machine incidence matrix in the following table to identify logical part family and machine groups. Parts are identified by letter and machines are identified numerical. (5

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

(B) What is AS/RS system? Explain types of AS/RS and its applications. (6)

Q.3 **Write a Following Answer.**

(A) Why is part classification and coding required in GT. Explain OPTIZ System of coding? (4)

(B) Explain the inputs of MRP system in brief. (4)

(C) Why group technology is known as Cellular Manufacturing? (4)

SECTION – II

Q.4 (A) What is a Flexible Manufacturing system? What renders it so flexible? (4

(B) What is the importance's of Tool holding device in CNC machine tool? Explain (4

(C) Briefly describe about types of electrical drives used in CNC machine tools. (4

OR

Q.4 (A) Write merits of Computer Integrated Manufacturing and how it helps to world-class manufacturing and manufacturing Excellence (4

(B) Enlist the FMS components. And Explain the FMS layout configurations in detail. (4

(C) What is ATC? Explain the types of ATC. (4

Q.5 (A) Explain the different between BTR system of DNC and Special Machine controlled unit system of DNC. (4

(B) Classified the NC System and Explain the Motion controlled systems. (3

(C) What is Adaptive control machining system? Explain types of adaptive control machining system. (4

OR

Q.5 (A) Define the following terms of FMS. 1) FMC 2) FMG. (2

(B) An FMS is used to produce three products. The FMS consists of a load/? Unload station, two automated processing stations, an inspection station, and an automated conveyor system with an individual cart for each product. The conveyor carts remain with the parts during their time in the system, and therefore the mean transport time includes not only the move time, but also the average total processing time per part. The number of servers at each station is given in the following table: (9

Station	Description	Number of Servers
1	Load and Unload	2 Workers
2	Process X	3 servers
3	Process Y	4 server
4	Inspection	1 server
Transport System	Conveyor	8 carriers

All the parts follow of two routings, which are 1→ 2→ 3→ 4→ 1. or 1→ 2→ 3→ 1, The difference being that inspections at station 4 are performed on only one part in four for each product (Fijk = 0.25). The product mix and process times for the parts are presented in the table below:

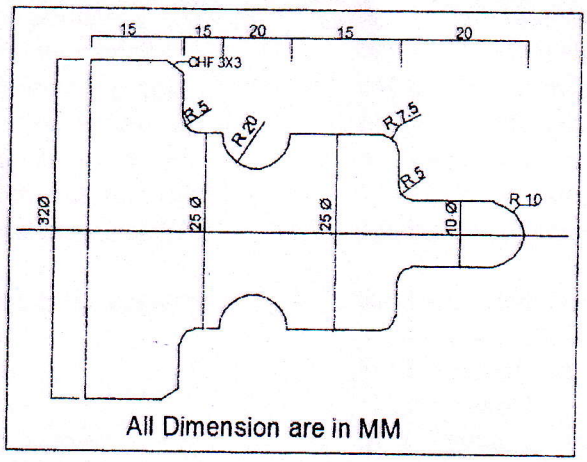
Product j	Product Mix Pj	Station 1 (min)	Station 2 (min)	Station 3 (min)	Station 4 (min)	Station 1 (min)
A	0.2	5	15	25	20	4
B	0.3	5	10	30	20	4
C	0.5	5	20	10	20	4

The move time between stations is 4 min. a) using the bottleneck model, show that the conveyor system is the bottleneck in the present FMS configuration, and determine the overall production rate of the system: b) Determine how many carts are required to eliminate the conveyor system as the bottleneck, c) With the number of carts determined in (b), use the extended bottleneck model to determine the production rate for the case when N=8: that is, only eight parts are followed in the system even though the conveyor system has a sufficient number of carriers to handle more than eight.

Q.6 **Write a Following Answer.**

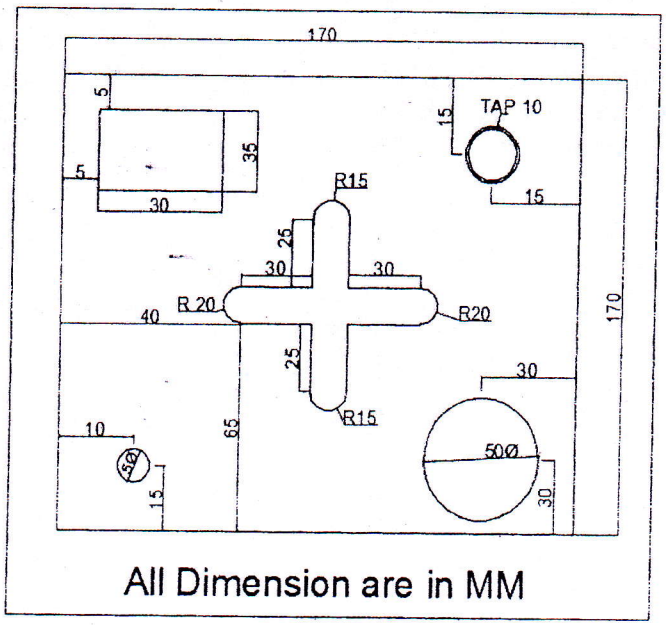
(A) Write a CNC Turning Center Program of given components. **(5)**

Raw Material size: 90 mm Long. X 33Φ



(B) Write a CNC Machining Center Program of given components. **(7)**

Raw Material size: 170 mm X 170 mm X 10 mm thick.



Depth for all operations are 10 mm.(Throughout cut)

END OF PAPER

PREPARATORY FUNCTIONS (G CODES):

G00 – Rapid transverse positioning
G01 – Linear interpolation (federate movement)
G02 – Circular interpolation clockwise
G03 – Circular interpolation counterclockwise
G04 – Dwell
G10 – Tool length offset value
G17 – Specifies X/Y plane
G18 – Specifies X/Z plane
G19 – Specifies Y/Z plane
G20 – Inch data input (on some systems)
G21 – Metric data input (on some systems)
G27 – Reference point return check
G28 – Return to reference point
G29 – Return from reference point
G30 –Return to second reference point
G40 – Cutter diameter compensation cancel
G41 – Cutter diameter compensation left
G42 – Cutter diameter compensation right
G43 – Tool length compensation positive direction
G44 – Tool length compensation negative direction
G45 – Tool offset increase
G46 – Tool offset decrease
G47 – Tool offset double increase
G48 – Tool offset double decrease
G49 – Tool length compensation cancel
G80- Canned cycle off
G81- Std. drilling cycle
G82- Dwell drilling cycle
G83 – Peak drilling cycle
G84 – Fine boring cycle
G85 – Boring cycle (feed return to reference level)
G86 – Boring cycle (rapid return to reference level)
G87 – Back boring cycle
G88 – Boring cycle (manual return)
G89 – Boring cycle (dwell before feed return)
G90 – Specifies absolute positioning
G91 – Specifies incremental positioning
G92 – Program absolute zero point
G98 – Return to initial level
G99 – Return to reference (R) level.

MISCELLANEOUS (M) FUNCTIONS:

M00 – Program stop
M01 – Optional stop
M02 – End of program (rewind tape)
M03 – Spindle start clockwise
M04 – Spindle start counterclockwise
M05 – Spindle stop
M06 – Tool change

M08 – Coolant on
M09 – Coolant off
M13 – Spindle on clockwise, coolant on (on some systems)
M14 – Spindle on counterclockwise, coolant on
M17 – Spindle and coolant off (on some systems)
M19 – Spindle orient and stop
M30 – End of program, memory reset
M98 – Jump to subroutine
M99 – Return from subroutine