Exam No: _____

GANPAT UNIVERSITY
M.TECH SEM I (MECHANICAL-CAD/CAM)
REGULAR EXAMINATION JAN-2013
3ME115 COMPUTER INTEGRATED MANUFACTURING

TIME – 3 HOURS   **TOTAL MARKS- 70**

INSTRUCTION:-   1) All questions are compulsory.
                      2) Figures to the right indicate full marks.
                      3) Make suitable assumptions wherever necessary.
                      4) Programming code (G and M codes) is given at the end of paper.

SECTION-I

Que-1   [12]

(a) What do you understood in CIM? Which type of Activities of CIM?

(b) A flexible manufacturing cell consists of two workstation plus and load/unload station. The load/unload station 1.Station 2 will perform milling operations and consists of one server (one CNC milling machine). Station 3 has one server that performs drilling (one CNC drill press). The three stations are connected by a part handling system that has one work carrier. The mean transport time is 2.5 min. The FMC produce three parts A,B and C the part mix fractions are process routings for the three parts are presented in the table below. The operation frequency F_{ijk}= 1.0 for all operation.

Part j	Part Mix Pj	Operation k	Description	Station i	Process Time t_{ijk}(min)
A	0.2	1	Load	1	3
		2	Mill	2	20
		3	Drill	3	12
		4	Unload	1	2
B	0.3	1	Load	1	3
		2	Mill	2	15
		3	Drill	3	30
		4	Unload	1	2
C	0.5	1	Load	1	3
		2	Drill	3	14
		3	Mill	2	22
		4	Unload	1	2

Use the extended bottleneck model on above data to compute: Production rate, manufacturing lead time and waiting time for two value: i) N=2 and ii) N=4.

OR

Que-1   [12]

(a) Enlist the FMS Elements and explain about FMS layout.

(b) Five machines constitute a GT cell. The From/To data for the machine are shown in the table below. (a) Determine the most logical sequence of machines for this data, and construct the network diagram, showing where and how many parts enter and exit the system. (b) Compute the percentages of in-sequence moves, bypassing moves, and backtracking moves in the solution. (c) Develop a feasible layout plan for the cell based on the solution.

		TO				
		A	B	C	D	E
	A	0	10	80	0	0
	B	0	0	0	85	0
FROM	C	0	0	0	0	0
	D	70	0	20	0	0
	E	0	75	75	20	0

Que-2 [11]

(a) Write a program of CNC Turning Center for following component shown in fig(A):
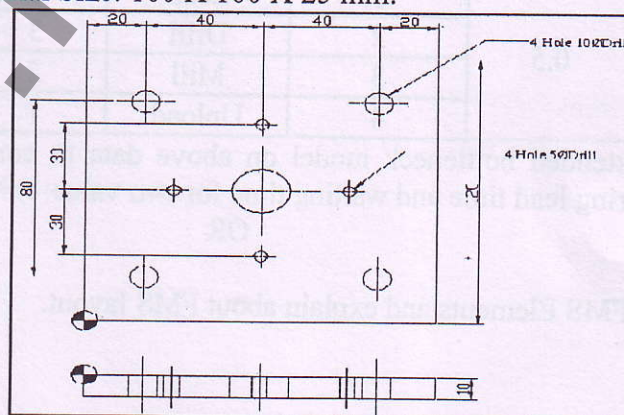Raw Material Size: 30 Ø mm X 80 Ø mm Long.
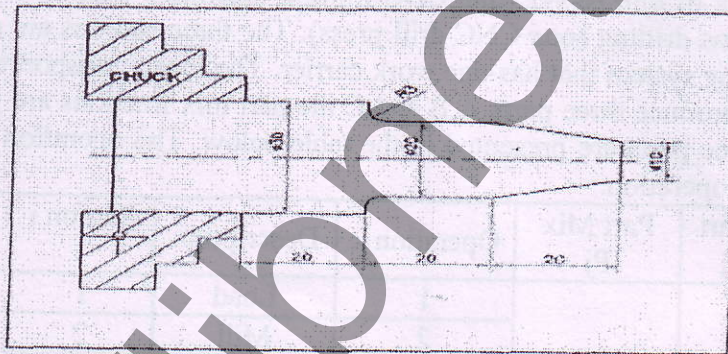
Fig(A)

(b) What is Storage buffer? Why storage buffer are used on automated production line? How they control of production line.

OR

Que-2 [11]

(a) Write a program of CNC Machining Center for following component shown in fig(B) Raw Material Size: 100 X 100 X 25 mm.

Fig(B)

(b) Explain Carousel Storage system.

Que-3   **Attempt Any Three.**   **[12]**

(a) Enlist the types of AS/RS and explain its application in manufacturing industries.

(b) What is group technology? List their objective and explain the obstacles to the obstacles to the application of group technology. How the obstacles are removed?

(c) Explain in brief, the common techniques used for repetitive programming with proper illustrations.

(d) Enlist Machine Control Unit in NC system.

SECTION-II

Que-4   **[12]**

(a) Why Communication matrix required in CIM? Explain in detail Communication matrix.

(b) Define DBMS and explain its Abilities & features.

(c) Explain characteristics of computer simulation.

OR

Que-4   **[12]**

(a) How data can be presented and Why?

(b) Explain various type of communication in CIM.

(c) Describe information system in Automated Factory.

Que-5   **[11]**

(a) Explain communication matrix.

(b) What is Network and Networking? Explain most usable type of network.

OR

Que-5   **[11]**

(a) Explain Open System Interconnection (OSI) in Brief and How it is differ from TCP/IP.

(b) Explain classification of DBMS.

Que-6   **Attempt Any Three**   **[12]**

(a) Describe fundamental communication concepts.

(b) What do you mean by CAD/CAM integration? Explain application integration..

(c) What is requirement of Database management system in CIM?

(d) A text book is 787 pages long, Each page contains on average of 28 line, each line 10 words, If the word including blank space averages 5 characters, How much storage capacity required to store this book?.

********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)
G22 – Salary zone programming
G23 – Cross through safety zone
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
G50 – Scaling off
G51 – Scaling on
G73 – Peak drilling cycle
G74 – Counter tapping cycle
G76 – Fine boring cycle
G80 – Canned cycle cancel
G81 – Drilling cycle
G82 – Counter boring cycle
G83 – Peak drilling cycle
G84 – Tapping 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 (on some systems)
M17 – Spindle and coolant off (on some systems)
M19 – Spindle orient and stop
M21 – Mirror image X axis
M22 – Mirror image Y axis
M23 – Mirror image off
M30 – End of program, memory reset
M41 – Low range
M42 – High range
M48 – Override cancel off
M49 – Override cancel on
M98 – Jump to subroutine