

GANPAT UNIVERSITY
M. TECH SEM- I (ME-CAD/CAM) REGULAR EXAMINATION-NOV-DEC-2015
3ME115 COMPUTER INTEGRATED MANUFACTURING

MAX. TIME: 3 HRS

MAX. MARKS: 60

- Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.
 (2) Figures on right indicate marks.
 (3) Be precise and to the point in answering the descriptive questions.
 (4) Programming code (G and M codes) is given at the end of paper.

SECTION: I

Q.1

A flexible manufacturing system consists of four workstation plus and load/unload station. The load/unload station 1. Station 2 will perform milling operations and consists of three server (one CNC milling machine). Station 3 has two server that performs drilling (one CNC drill press). Station 4 is an inspection station with one server. The stations are connected by a part handling system that has two work carriers and a mean transport time = 3.5 min. The FMC produce Four parts A,B,C and D. The part mix fractions are process routings for the four parts are presented in the table below. Note that the operation frequency at the inspection station (f_{4jk}) is less than 1.0 to account for the fact that only a fraction of the parts are inspected. Determine: (a) maximum production rate of FMS, (b) corresponding production rate of each part, (c) utilization of each station in the system, and (d) the overall FMS utilization. (10)

Part j	Part Mix P _j	Operation k	Description	Station i	Process t _{ijk} (min)	Time	Frequency f _{ijk}
A	0.1	1	Load	1	4		1.0
		2	Mill	2	24		1.0
		3	Drill	3	14		1.0
		4	Inspect	4	13		0.5
		5	Unload	1	2		1.0
B	0.2	1	Load	1	4		1.0
		2	Drill	3	20		1.0
		3	Mill	2	30		1.0
		4	Drill	3	15		1.0
		5	Inspect	4	15		0.2
		6	Unload	1	2		1.0
C	0.3	1	Load	1	4		1.0
		2	Drill	3	20		1.0
		3	Inspect	4	8		0.5
		4	Unload	1	2		1.0
D	0.4	1	Load	1	4		1.0
		2	Mill	2	20		1.0
		3	Inspect	4	12		0.333
		4	Unload	1	2		1.0

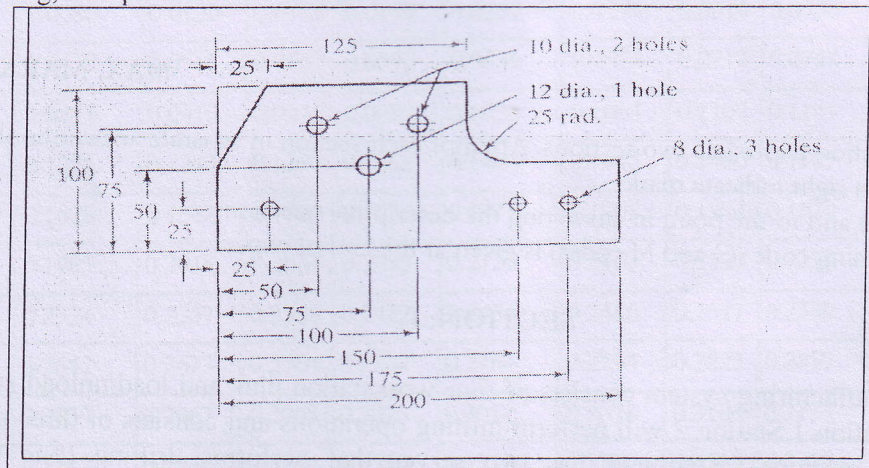
OR

- Q.1 (A) 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. (10)

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

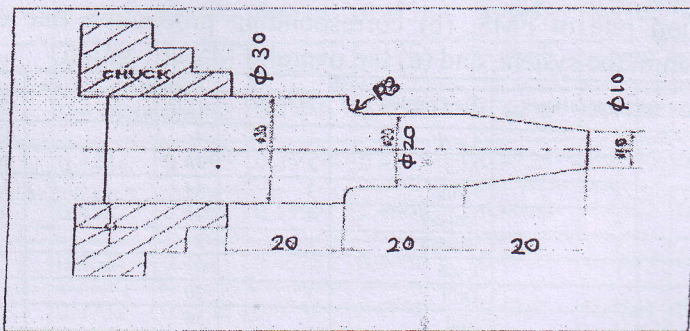
(B) Enlist basic parts of robot & explain functionality of each part.

- Q.2 (A) What is AS/RS system? Why it required? Compare AS/RS with Casousel storage system. (10)
(B) Write the part program to drill the holes in part shown in figure (C), Raw Material Size: 100 mm X 200 mm Long, The part is 15 mm thick.



OR

- Q.2 (A) Enlist the FMS Elements and explain about FMS layout. (10)
(B) Write a program of CNC Turning Center for following component shown in fig Raw Material Size: 30 Ø mm X 80 Ø mm Long.



- Q.3 Attempt Any Two. (10)
(A) What is FMS? What are the basic components of FMS? Give benefits of FMS.
(B) Explain OPITZ and MICLASS coding system of GT to form part families.
(C) What is material handling? Explain about equipment's used for material handling.

SECTION: II

- Q.4 (A) Discuss in brief construction and working of stepper motor. (10)
(B) What is DNC? Discuss about its components. Give its advantages and disadvantages.

OR

- Q.4 (A) What is feedback system? Explain about feedback system used in CNC machine. (10)
(B) Why Communication matrix required in CIM? Explain in detail Communication matrix.

- Q.5 (A) Explain various type of communication in CIM. (10)
(B) Enlist Machine Control Unit in NC system.

OR

- Q.5 (A) Explain classification of DBMS. (10)
(B) What is Network and Networking? Explain most usable type of network.

Q.6 Attempt Any Two.

- (A) A text book is 420 pages long, Each page contains on average of 25 line, each line 10 words. If the word including blank space averages 7 characters, How much storage capacity required to store this book?
- (B) How data can be presented and Why?
- (c) What do you understood in CIM? Which type of Activities of CIM?

-----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
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
G73 – Peak drilling cycle
G74 – Counter tapping cycle
G76 – Fine boring cycle
G80 – Canned cycle cancel
G81 – Drilling cycle

G83 – Peak drilling 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

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
M41 – Low range
M42 – High range
M48 – Override cancel off
M49 – Override cancel on
M98 – Jump to subroutine