Exam No: _____

GANPAT UNIVERSITY

M. TECH SEM- II (ME-AMT) REGULAR EXAMINATION– April - June 2015

3ME201 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 cell consists of three plus a load/unload stations. The load/unload station is stations1 using two servers (material handling workers). Station 2 performs milling operations and consists of two server(two CNC milling machine). Station 3 performs vertical milling operations with three servers(three identical CNC vertical milling machine). Station 4 has two server that performs drilling (two CNC drill press). The three stations are connected by a part handling system that has three work carrier. The mean transport time is 3.5 min. The FMC produces four parts A, B, C and D, 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 operations. Determine: a) maximum production rate of the FMC, b) corresponding production rates of each product. **(10)**

Part j	Part Mix Pj	Operation k	Description	Station i	Process Time t_{ijk} (min)
A	0.2	1	Load	1	4
		2	Mill	2	15
		3	V.Mill	3	14
		4	Drill	4	13
		5	Unload	1	3
B	0.3	1	Load	1	4
		2	Drill	4	12
		3	Mill	2	16
		4	V.Mill	3	11
		5	Drill	4	17
		6	Unload	1	3
C	0.5	1	Load	1	4
		2	Mill	2	10
		3	Drill	4	9
		4	Unload	1	3
D	0.35	1	Load	1	4
		2	V.Mill	3	18
		3	Drill	4	8
		4	Unload	1	3

Suppose it is decided to increase the utilization of the two non-bottlenecks machining stations in the FMS by introducing a new past, part E, into the part mix. If the new product will be produced at a rate of 2 units/hr, what would be the ideal process routing (sequence and processing times) for part E that would increase the utilization of the two non-bottleneck machining stations to 100% each? The respective production rats of part A, B, C, and D will remain the same. Disregard the utilization of the load/unload station and the part handling system.

OR

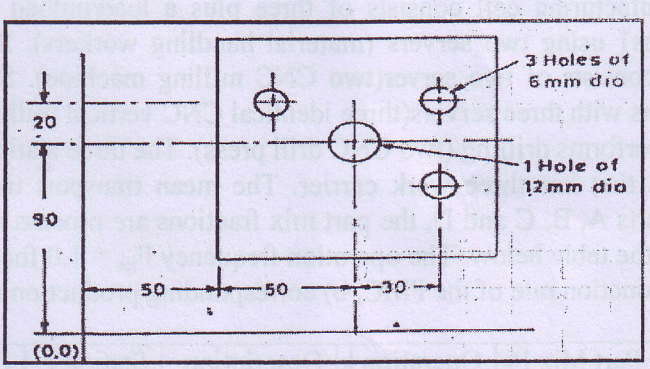
Q.1 (A) Enlist the types of AS/RS and explain its application in manufacturing industries. (10)

(B) Consider the following machine-component incidence matrix with 7 machines and 5 components. Obtain the final machine-component cells using Rank Order Clustering Algorithm.

		Component				
		1	2	3	4	5
Machine	1	0	1	0	1	0
	2	1	0	0	0	1
	3	0	1	1	0	0
	4	1	0	0	0	1
	5	0	0	1	1	0
	6	0	0	0	0	1
	7	0	1	1	1	0

Q.2 (A) What are the various approaches available for CAPP? (10)

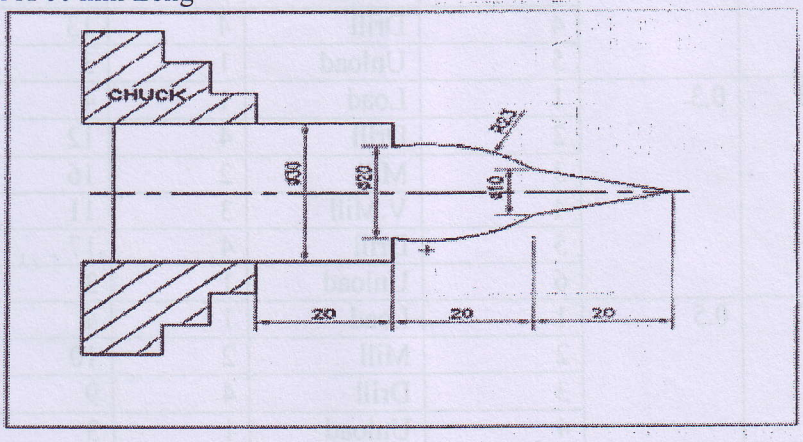
(B) Write a part program for PTP: Z level at 5 mm above the plate surface. And plate thickness = 10 mm. shown in fig.



OR

Q.2 (A) Enlist basic parts of robot & explain functionality of each part. (10)

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



Q.3 **Attempt Any Two.** (10)

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

(B) What is material handling? Explain about equipment's used for material handling.

(C) Define manual part programming. What is meant by tool offset, tool length offset and cutter diameter compensation?

SECTION: II

Q.4 (A) Why Communication matrix required in CIM? Explain in detail Communication matrix. (10)

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

OR

Q.4 (A) Explain LAN concept its importance and different protocol and types. (10)

(B) Explain classification of Database manufacturing system and classification of DBMS.

Q.5 (A) Draw CIM Wheel and explain strength and weakness of CIM Wheel. (10)
(B) Explain the steps for implementing CIM in any organization.

OR

Q.5 (A) What do you mean by CAD/CAM integration? Explain application integration. (10)
(B) Describe fundamental communication concepts.

Q.6 **Attempt Any Two.** (10)

(A) A text book is 600 pages long, Each page contains on average of 29 line, each line 9 words, If the word including blank space averages 6 characters, How much storage capacity required to store this book?.

(B) Enlist Machine Control Unit in NC system.

(c) What do you know about Preset tooling for NC turning machine? What are the various features to be taken care of while designing a CNC tool.

----------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
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
G49 – Tool length compensation cancel
G73 – Peak drilling cycle
G74 – Counter tapping cycle
G76 – Fine boring cycle
G80 – Canned cycle cancel
G81 – Drilling cycle
G83 – Peak drilling cycle
G87 – Back boring cycle
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
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