Exam No:

## GANPAT UNIVERSITY M. TECH SEM- I (AMS) CBCS REGULAR EXAMINATION NOV-DEC 2017

### 3ME103 ADVANCED MANUFACTURING PROCESS-I

#### MAX. TIME: 3 HRS

#### MAX. MARKS: 60

[10]

[10]

[10]

(5)

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) Assume suitable data if necessary.

## Section: I

#### Q.1

Q.1

Q.2

Q.2

- [A] Draw the schematic diagram and discuss the role of subsystem used in water jet (5) machining.
- [B] Draw the schematic diagram and explain the working principle of laser machining (5) with its important characteristics, advantages, limitations and fields of applications.

#### OR

- [A] Draw schematic diagram of abrasive jet machining and derive the equation for (5) Material removal rate for ductile and brittle materials in an abrasive jet machining.
- [B] With neat sketch explain the process principle of electro discharge machining for (5) Single discharge condition. Also draw the waveforms of relaxation power generator in EDM process with its all notations.
   [10]

[A] What is the six point location principle? Explain it with the help of suitable sketches. (5)

**[B]** Explain cryogenic machining and micro machining process with neat sketch. What is (5) the importance of it in manufacturing?

#### OR

- [A] List the various types of locating devices used for both Jigs and Fixture and Explain (5) any three of them with neat sketch.
- [B] What is the effect of temperature in metal forming process? Explain how mechanical (5) properties vary with temperature in carbon steel.

#### O.3 Attempt Any Two:

- [A] State various thread manufacturing methods. Explain any two of them briefly. (5)
- **[B]** With suitable assumption derive the condition for material removal rate for brittle (5) Material machined by ultrasonic machining. Material removal rate can be express as:  $5.9 \text{ R}^{-1/2} \text{ Y}_0^{-r/2} (\sigma/\text{H}) \text{ f (mm/second)}.$ Where R : Radius of grit,  $\sigma$  = Stress,

H : Hardness, f= Frequency, Y<sub>0</sub>: Amplitude of vibration

[C] Write a short note: Explosive forming

# Section: II

Q.4	[A]	Write a short note on advance cutting tool materials along with its characteristics and	[10] (5)
×.		applications.	
	[ <b>B</b> ]	How do you define tool life? Explain the parameters that control the tool life of a	(5)
		single point cutting tool in detail.	
		OR	[10]
Q.4	[A]	Explain the effect of following factors on the rolling load.	(5)
		<ul> <li>(a) The coefficient of friction</li> <li>(b) Forward and backward tension</li> <li>(c) Reduction</li> <li>(d) diameter of rolls</li> </ul>	
	[B]	Derive the expression for pressure distribution for forging of a Rectangular with open die condition.	(5)
Q.5			[10]
	[A]	The following data from an orthogonal cutting test is available:Rake angle = 150chip thickness ratio = 0.383Uncut chip thickness = 0.5mmwidth of cut = 3mmYield stress of material in shear = 280N/mm20.7	(5)
		Average co-efficient of friction on the tool face $= 0.7$ Determine the normal and tangential forces on the tool face.	
	[B]	In rolling process, 25mm thick plate is rolled to 20mm in a four high mill. Determine the co efficient of friction if this is the maximum reduction possible. Roll diameter is 500mm. Find neutral section, backward and forward slips and maximum pressure. $\sigma_0 = 100 \text{ N/mm}^2$ for hot rolls of mild steel at about $1100^0 \text{ C}$ .	(5)
		OR	[10]
Q.5		the the following schedule:	[10] (5)
	[A]	A 50 mm thick plate is decreased in thickness according to the following schedule: 25,12.5,5 mm. compute the total strain on the basis of initial and final dimensions And the summation of the incremental strains using (a) Conventional strain and	(5)
		(b) True strain How does this show an advantage for the use of true strain in metal forming work?	
	[B]	Find the principal normal stress, shear stress and orientation of the axes of principal stress with x- axes for the following situation:	(5)
	к 	$\sigma_x = -410 \text{ MPa}$ $\sigma_y = 34 \text{ MPa}$ $\sigma_z = 170 \text{ MPa}$	
Q.6		Attempt Any Two:	[10]
~	[A]	Write a short note on: Yielding criteria in a metal forming process	(5)
	[ <b>B</b> ]	What is meant by machinability? Explain the method of representing machinability.	(5)
	[C]	Why the gear hobbing machine is more productive than a gear shaper? Discuss various gear finishing operation.	(5)

# End of Paper