

GANPAT UNIVERSITY

M. TECH SEM- 1st Mechanical (CAD-CAM)

CBCS (NEW) REGULAR EXAMINATION NOV-DEC 2015

3ME112 Advanced Metal Forming and Machining Processes

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.

Section -1

- QUE-1 (A) Differentiate between true strain and conventional strain. Discuss the need of true stress and strain in analysis of metal forming process. 5
- (B) A 24 mm thick plate is decreased in thickness according to the following schedule 12, 6, 3 mm. compute the total strain on the basis of initial and final dimensions and the summation of the incremental strains using (1) conventional strain (2) true strain. 5

OR

- QUE-1 (A) Differentiate between cold, hot and warm working of metals. Give advantages and limitation of these methods. 5
- (B) Explain slip line field theory criteria for metal working operation. 5

- QUE-2 (A) Explain the strain hardening phenomenon. What is the effect of strain hardening on plastic deformation? 5
- (B) Explain explosive forming. 5

OR

- QUE-2 (A) Write a short note on analysis of wire drawing process. 5
- (B) A cube of certain metal is subjected to principle stresses which are in the following proportional $\sigma_1:\sigma_2:\sigma_3 = 2:1:0$ determine the magnitude of σ_1 for yielding according to (1) Von-mises yield criteria 5
(2) Tresca yield criteria. The tensile yield stress is 3000 N/cm^2

- QUE-3 (A) What do you understand by yielding of materials? Discuss different criteria for yielding. 5
- (B) Explain the following terms with respect to rolling of metal 5
(1) lagging zone
(2) leading zone
(3) neutral section
(4) forward slip

SECTION-2

- Q.4 (A) With specific example enlist the necessities that contribute the development of non traditional machining processes also make possible classification. 5
- (B) With the help of schematic diagram explain the roll of subsystems used in water jet machining process. 5

OR

- Q.4 (A) Define electrical discharge machining. Briefly explain the effect of process parameters on surface finish for electrical discharge machining. 5
- (B) With automatic electrode re feed concept explain the importance of servo controlled system in electro discharge machining also brief out the importance of flushing system in electro discharge machining. 5

- Q.5 (A) Draw schematic diagram of abrasive jet machining and derive the equation for material removal rate for ductile and brittle material in an abrasive jet machining 5
- (B) Explain working of ultrasonic machining process. 5

OR

- Q.5 (A) Draw the schematic diagram and explain the working principle of laser machining with its important characteristics, advantages, limitation and field of application. 5
- (B) Prove mathematically that dissolution rate fall at zero feed rate in electro chemical machining. 5

- Q.6 (A) Write significance of different transducers used in ultrasonic machining process. 5
- (B) Prove that in machining of brittle material by ultrasonic machining the MRR can be expressed as $MRR=4.17 D^{1/2} Y_0^{1/2}(\sigma/H) f$ (mm/ second). 5
Where D= diameter of grit, σ =stress, H = hardness, f= frequency, Y_0 =amplitude of vibration

-----**END OF PAPER**-----