

**GANPAT UNIVERSITY**  
**M.Tech. [ME (AMT)] Sem-II**  
**REGULAR EXAMINATION MAY JUNE 2014**  
**3ME204 - PRECISION AND QUALITY ENGINEERING**

TIME - 3 HOURS

TOTAL MARKS- 70

**INSTRUCTIONS:-**

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Make suitable assumptions wherever necessary.

**SECTION-I****Que-1 Attempt All.**

- (a) Describe the honing process with appropriate figure.
- (b) Explain etching process in micromachining.
- (c) Explain in detail magnetic float polishing process.

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**OR****Que-1 Attempt All.**

- (a) Give the types of micromachining process and explain one of it.
- (b) Discuss the five major steps of product's life cycle.
- (c) Explain the defect categorization in precision vision, inspection & measurement system.

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**Que-2 Attempt All.**

- (a) Explain the laser machining process with appropriate figure.
- (b) Give the comparison between normal, precision & ultra precision machining.

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**OR****Que-2 Attempt All.**

- (a) Explain in detail about ultra precision machining process.
- (b) Describe with figure the laser interferometer.

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**Que-3 Attempt All.**

- (a) Explain LIGA process.
- (b) Give the name of precision finishing processes. Explain one of it.
- (c) Describe in detail about an air bearing.

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**SECTION-II****Que-4 Attempt All.**

- (a) Enlist Juran's steps for quality improvement and explain them in brief.
- (b) Explain the concept of lean manufacturing.
- (c) Explain the quality and reliability.

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**OR****Que-4 Attempt All.**

- (a) What is concurrent engineering? Write down advantages of it.
- (b) "Inspection planning is a part of planning for quality" Discuss the statement.
- (c) Describe the basic elements of reliability.

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Que-5 Attempt All.

- (a) Define the term "Quality control" and explain its advantages over inspection techniques. 11  
(b) Control charts for  $\bar{X}$  and R are maintained on certain dimensions of a manufactured part, measured in mm. The subgroups size is 4. The values of  $\bar{X}$  and R are computed for each subgroup. After 20 subgroups  $\sum \bar{x} = 412.83$  and  $\sum R = 3.39$ . Compute the values of 3 sigma limits for the  $\bar{X}$  and R chart and estimate the value of  $\sigma'$  on the assumption that the process is in statistical control. Take  $d_2 = 2.059, D_3 = 0$  and  $D_4 = 2.28$  5  
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OR

Que-5 Attempt All.

- (a) What is the meaning of quality of conformance? Explain the factors which influence the quality of conformance. 11  
(b) A sub-group of 5 items each are taken from a manufacturing process at a regular interval. A certain quality characteristic is measured and  $\bar{X}$  and R values computed. After 25 subgroups it is found that  $\sum \bar{X} = 357.50$  and  $\sum R = 8.80$ . If the specification limits are  $14.40 \pm 0.40$ ; and if the process is in statistical control, what conclusions can you draw about the ability of the process to produce items within specification? Take  $d_2 = 2.326$ . 5  
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Que-6 Attempt all.

- (a) Describe Taguchi's parameter design and tolerance design briefly. 12  
(b) Describe robust design with example. 4  
(c) Explain T.Q.M. operation in brief. 4  
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\*\*\*\*\*END OF PAPER\*\*\*\*\*