

GANPAT UNIVERSITY
M.Tech.[ME-(AMS)] Sem-II CBCS (New) Regular MAY JUNE 2017
3ME204 Precision and Quality Engineering

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: I

- Q.1 Attempt all.** (10)
- A Exemplify the terms accuracy and precision with neat sketches. (5)
- B Write in detail about laminated carbides, CVD coated carbides and PVD coated carbides. (5)
- OR**
- Q.1 Attempt all.** (10)
- A Discuss about four classes of achievable machining accuracy. (5)
- B Explain the diamond coated carbides, PCDs and single crystal diamonds. (5)
- Q.2 Attempt all.** (10)
- A Explain the major changes that have taken place in the conventional machine tool components to meet ultra-precision requirements. (5)
- B Describe the linear motor drive with its important advantages. (5)
- OR**
- Q.2 Attempt all.** (10)
- A Discuss the various types of Guideways with its designing aspects. (5)
- B Explain the principle of hydrostatic lubrication and principle of hydrodynamic bearings. (5)
- Q.3 Attempt all.** (10)
- A Write in detail about Characteristics and principles of MEMS. (3)
- B A hole and mating shaft are to have a nominal assembly size of 40mm. The assembly is to have a maximum clearance of 0.15 mm and a minimum clearance of 0.05 mm. The hole tolerance is 1.5 times the shaft tolerance. Determine the limits for both hole and shaft by using 1) Hole basis system , 2) Shaft basis system. (3)
- C A 50 mm diameter shaft is made to rotate in a bush. The tolerances for both shaft and bush is 0.050 mm. Determine the dimensions of the shaft and the bush to give a maximum clearance of 0.075 mm with the hole basis system. (2)
- D Exemplify the superfluous dimensioning. (2)

SECTION: II

- Q.4 Attempt all. (10)
A Explain failure pattern for complex product. (5)
B Define TQM. State the requirements for the successful working of TQM program in an industrial organization. (5)

OR

- Q.4 Attempt all. (10)
A What is Benchmarking? State the objectives of Benchmarking. Discuss the step involved in implementation of Benchmarking. (5)
B Determine the control limit for, \bar{X} and R charts if $\sum \bar{x} = 357.50$, $\sum R = 9.90$. Number of sub groups = 20. It is given that $A_2 = 0.18$, $D_3 = 0.41$, $D_4 = 1.59$ and $d_2 = 3.735$. Also find the process capability. (5)

- Q.5 Attempt all. (10)
A What is ISO-9000, QS-9000 and ISO-14000? Discuss the implementation of ISO 9000. (5)
B State and explain the factor's to be considered in designing for reliability and find if an element having mean life of 5000 hours and a uniform failure rate, what is the reliability associated with a specified service period of 200 hours. (5)

OR

- Q.5 Attempt all. (10)
A Control charts for \bar{X} and σ are maintained on the weight in Kg. of the contents of a certain container. The subgroup size is 10. The values of \bar{X} and σ are computed for each subgroup. After 18 Subgroups $\sum \bar{x} = 595.8$ and $\sum \sigma = 8.24$ Compute the value of σ' on the assumption that the process is in statistical control. Take $A_1 = 1.03$ $B_4 = 1.73$ and $B_3 = 0.28$. (5)
B Define Six Sigma and explain the concept of Six Sigma quality approach. (5)

- Q.6 Attempt all. (10)
A Write a short note on Taguchi's philosophy. (4)
B What is TQM? Discuss the elements of TQM. (4)
C Describe the concept of concurrent engineering. (2)

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