MECHANICAL ENGINEERING DEPARTMENT

MAJOR TEST QUESTION PAPER

SUBJECT: MEL 235 (Quality Assurance Part)

ANSWER ON SEPARATE ANSWER-BOOK

MAX MARKS : 20

Q 1. a) What are different stages in a Total Quality Control Program? Explain their inter-dependence.

b) What are process capability indices? What remedial actions would you suggest if a process is not capable of meeting the specifications (both U and L)?

6

Q 2. Differentiate between:

a) Producer's risk *and* Consumer's risk
b) OC Curve *and* ATI Curve
c) $\overline{X}$ charts with conventional limits *and* reject limits
d) $\overline{X}$ chart *and* p chart

6

Q 3. $\overline{X}$ and R charts have been maintained on a certain process with a subgroup size of four. A suggestion is made to increase the sample size from 4 to 5, but maintain the same limits as before. Discuss the consequences if this suggestion were followed particularly with regard to its effect on Type 1 and Type 2 errors for $\overline{X}$ and R charts.

4

Q 4. All points have fallen within control limits on $\overline{X}$ and σ charts for certain quality variable. A sudden change in the process occurs that decreases the process setting by 0.25 σ', but does not change σ' (where σ' is process dispersion). If the subgroup size is 16, what percentage of points are expected to fall outside the control limits on $\overline{X}$ chart, and on sigma chart? State the assumptions made.

4