

22657

12425

03 Hours / 70 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
- (2) Answer each next main Question on a new page.
- (3) Illustrate your answers with neat sketches wherever necessary.
- (4) Figures to the right indicate full marks.
- (5) Assume suitable data, if necessary.
- (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
- (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. **Attempt any FIVE of the following :** **10**
- a) State the need of time study.
 - b) Define Supply Chain Management (SCM).
 - c) State the difference between inspection and quality control.
 - d) Write any four advantages of Ergonomics.
 - e) State any four characteristics of good quality product.
 - f) Enlist any four benefits of SQC.
 - g) Define Central Tendency and Dispersion.

P.T.O.

2. Attempt any THREE of the following :

12

- a) Define Anthropometry and explain with example “How anthropometric data is used in design mechanical system.”
- b) Sketch the symbols of following therbligs
 - i) Search
 - ii) Assemble
 - iii) Transport Loaded
 - iv) Rest
- c) Prepare Operation processes sheet and sequence of operation for the job shown in the figure given below:

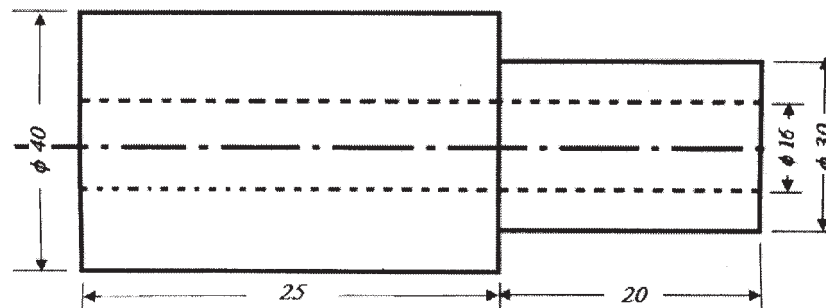


Fig. No. 1

- d) Explain the four costs involved in economics of quality.

3. Attempt any THREE of the following :

12

- a) State any four causes of worker's fatigue and remedies to minimize it.
- b) Write down the basic steps in method study.
- c) Construct two handed process chart for the assembly of nut and bolt with summary.
- d) State and explain the factors affecting the process planning.

4. Attempt any THREE of the following :**12**

- a) Explain the following terms used in CPM -
 - i) Event
 - ii) Activity
 - iii) Network
 - iv) Dummy Activity
- b) State the ergonomic considerations used while designing the following machine parts:
 - i) Push Button
 - ii) Pedals
 - iii) Knobs
 - iv) Hand Wheels.
- c) Apply Ergonomic principles for designing display unit of reciprocating air compressor.
- d) Explain the cause and effect diagram for the pitch error in threads.
- e) Explain in detail 'OC' curve and show following elements on OC curve.
 - i) α - Risk
 - ii) β - Risk
 - iii) AOQ
 - iv) LTPD

5. Attempt any TWO of the following :

12

- a) A shop floor activity consists of three elements. Calculate the standard time for the activity. The various allowances are given as percentage of normal time.

| Elements | A | B | C |
|--------------------------|------|-----|------|
| Observed Time (Minutes) | 1.25 | 1.2 | 2.85 |
| Rating Factor (%) | 90 | 115 | 85 |
| Relaxation Allowance (%) | 12 | 13 | 8 |
| Delay Allowance (%) | 3 | 6 | 5 |
| Personal Allowances (%) | 8 | 6 | 4 |

- b) State the principles of TQM and describe any two principle of TQM.
- c) Enlist the types of sampling plans. Explain double sampling plan with suitable example.

6. Attempt any TWO of the following :

12

- a) Calculate the mean, mode and median for following

| Observation No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|-----------------|------|------|------|------|------|------|------|------|------|------|
| Observations | 4.11 | 4.18 | 4.19 | 4.22 | 4.25 | 4.15 | 4.16 | 4.18 | 4.18 | 4.20 |

- b) In a manufacturing process, the numbers of defectives found in the inspection of 10 lots of 400 items are given below,

| Lot No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------------|---|---|----|---|---|----|---|---|---|----|
| Nos. of Defectives | 2 | 0 | 14 | 3 | 1 | 18 | 6 | 0 | 3 | 6 |

Determine the trial control limits for np chart and state whether the process is in control.

- c) State the necessity of ISO-9000 and Write it's advantages and disadvantage.
