

Faculty of Engineering and Technology  
Fifth Semester B.E. (Mech.)/Fourth Semester  
B.E. (Mech.) P.T. Examination  
**PRODUCTION TECHNOLOGY—I**  
**Sections—A & B**

Time : Three Hours]

[Maximum Marks : 80

**INSTRUCTIONS TO CANDIDATES**

- (1) All questions carry marks as indicated.
- (2) Answer **THREE** questions from Section A and **THREE** questions from Section B.
- (3) Assume suitable data wherever necessary.
- (4) Illustrate your answers wherever necessary with the help of neat sketches.
- (5) Use of design data book is permitted.

**SECTION—A**

1. (a) Calculate the Break Even Point and the turnover required to earn the profit of Rs. 36,000. Also express the margin of safety.

Fixed cost = Rs. 1,80,000

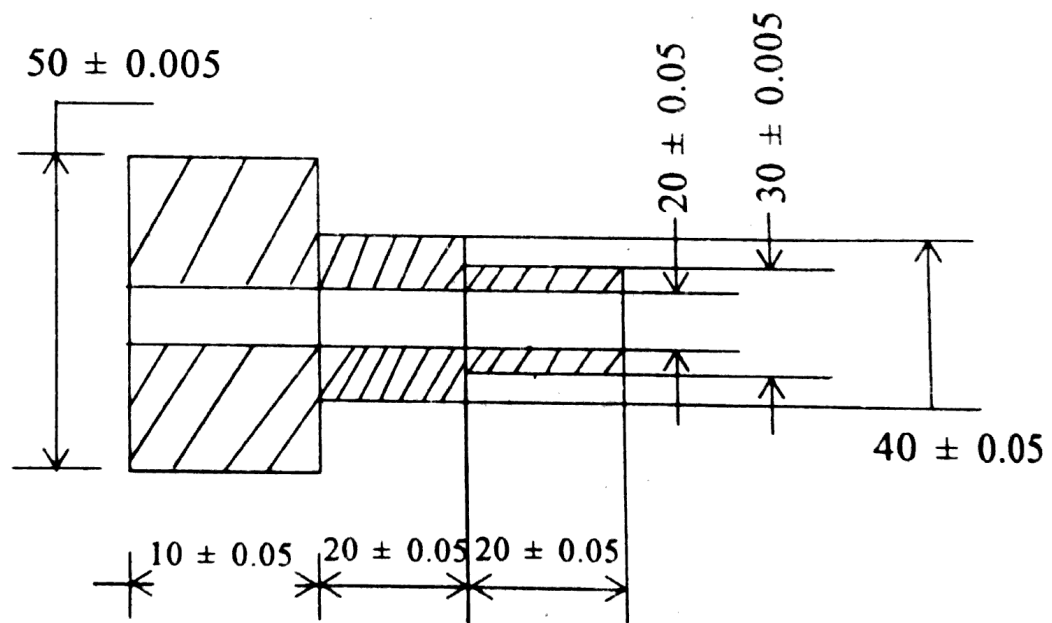
Variable cost per unit = Rs. 2

Selling price per unit = Rs. 20.

If variable cost per unit is increased to Rs. 4. What is percent change in BEP and margin of safety ?

8

- (b) What do you mean by Process Engineering ? What are the main functions of Process Engineering ? How it differs from Process Analysis ? 5
2. (a) Design plug gauge and snap gauge for checking shaft and hole pair of designation  $50 H_7 d_8$ . Assume gauge tolerance as 10% of work tolerance. Draw dimensional sketches and also explain type of fit. 10
- (b) Explain unilateral system and Bilateral system of tolerance. 3
3. A part is to be manufactured as shown in Figure No. 1.



Prepare plan to manufacture this part :

- (a) Draw machine selection chart and select raw material size.
- (b) Prepare simplified process planning sheet.
- (c) Prepare Tolerance chart. 13

4. (a) Explain how the straightness can be measure with the help of Auto-collimeter with a neat sketch. How the least square method is used to determine straightness ? 6
- (b) Explain with neat sketch back pressure type comparator giving its advantages, limitations and applications. 7
5. (a) Explain three wire method of measuring effective diameter of screw thread and compare it with two wire method. 7
- (b) Explain with neat sketch principle and working of sine bar. 7

### SECTION—B

6. (a) What are the different quality losses ? What is its effect on value of quality ? 4
- (b) A certain quality characteristics are measured and mean and range values are computed. After 25 samples of 5 items each,  $\Sigma \bar{x} = 357.5$  and  $\Sigma R = 8.80$ . If specification limits are  $14.4 \pm 0.40$  and the process is in a control, find :
  - (i) Upper and lower control limit for  $\bar{x}$  and R chart.
  - (ii) Process capability.
  - (iii) Process capability index.
  - (iv) Can the process meet the specifications and if not what remedial action can be suggested ? Assume  $d_2 = 2.326$ ,  $D_3 = 0$ ,  $D_4 = 2.11$ . 9

7. (a) In a manufacturing process, the number of defects found in inspection of 20 lots of 10 items is given below :—

| Lot No. | No. of defects | Lot No. | No. of defects |
|---------|----------------|---------|----------------|
| 1       | 6              | 11      | 4              |
| 2       | 11             | 12      | 6              |
| 3       | 15             | 13      | 7              |
| 4       | 9              | 14      | 8              |
| 5       | 6              | 15      | 2              |
| 6       | 4              | 16      | 6              |
| 7       | 5              | 17      | 7              |
| 8       | 3              | 18      | 5              |
| 9       | 4              | 19      | 6              |
| 10      | 5              | 20      | 7              |

Construct U-chart and find upper control limit and lower control limit. State whether the process is in a control or not. 8

- (b) What do you mean by quality of conformance ? Explain the factors which influence the quality of conformance. 5

8. (a) Explain the effect of lot size and sample size on O.C. curve. Define average sample number. 5

- (b) Differentiate between floor inspection and centralised inspection, giving advantages and limitations of each. 6

- (c) Define sampling plan for variables. 2

9. (a) In a multiple sampling plan, 5% sample size is selected from a lot of 1000 items. Acceptance number is 10% of sample size at first sample and it increases of 10% of sample size after every sample. The rejection number is 90% of sample size after first sample and reduces by 10% of sample size after every sample. Draw the sampling plan and find the number of samples in this plan. 6
- (b) Explain AOQL. How this limit helps in minimizing the acceptance of bad quality items ? 4
- (c) What are the advantages and limitations of sampling inspections ? 4
10. (a) What are the various elements of quality circle ? Explain functions of each elements. 5
- (b) What do you mean by quality assurance ? What activities are covered under it ? 4
- (c) What do you mean by quality planning ? What are its objectives ? 4

*Rhob*