B.E. MECHANICAL ENGINEERING (PART TIME) 4TH YEAR 2ND SEM. EXAMINATION, 2017(Old)

QUANTITY PRODUCTION METHOD

Time: Three hours   **Full Marks: 100**

Answer any FIVE questions

1a) Define a 'Production System'. Mention important features of 'intermittent production system'.   (2+8)

 b) Explain the different components of a production systems.   (10)

2a) Show the followings with a neat sketch with reference to a hole and a shaft:

   Allowance, Upper deviation, Fundamental deviation, Tolerance zones   (8)

 b) Differentiate between 'accuracy' and 'precision' with appropriate example.   (6)

 c) Show with a sketch the clearance fit, transition fit and interference fit considering 'hole basis' system.

     (6)

3a) Explain 'closed path method' to determine the tolerances of individual components.   (4+2)

 b) A 75 mm shaft rotates in a bearing. The tolerance for both shaft and bearing is 0.075 mm and the required

   allowance is 0.10 mm. Determine the high limits and the low limits of the shaft and the hole.   (4)

 c) Calculate the fundamental deviation and tolerances and hence the limits of size for the shaft and the hole for

   the fit "65 mm H8/f7''. The diameter steps are 50 mm and 80 mm. The fundamental deviation for shaft can

   be taken as ' $- 5.5D^{0.41}$ '. D bears usual meaning.   (10)

4a) Classify plain gauges according to types with brief explanation. Show with the help of diagrams allocation

   of manufacturing tolerances for 'GO' and 'NOT GO' plug gauge and snap gauge.   (4+6)

 b) Shafts of 75±0.02 mm diameter are to be checked with the help of a 'GO' and 'NOT GO' snap gauges.

   Design the gauge, sketch it and show its go size and not go size dimensions both for unilateral and bilateral

   system. Assume wear allowance as 5% and gauge maker's tolerance as 10%.   (10)

5. Derive the expression of maximum pressure and average pressure for plane strain open die forging under

   sliding friction. Show with the help of sketch the distribution of pressure (p) and horizontal stress (σ_x) .

     (16+4)

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6a) What are the uses of Break-Even Point analysis ?

The following data refer to a manufacturing unit:

Fixed cost = Rs. 100000; Variable cost = Rs 100 per unit; Selling price = Rs. 200 per unit.

(i) Calculate break-even point (ii) If the fixed cost increases to Rs. 125000 and variable cost reduces to Rs. 90 per unit, obtain new break-even point (iii) Calculate the number of components needed to be produced to get a profit of Rs. Rs. 20000.　　　　　　(3+7)

b) Estimate the time required on the shaper to complete one cut on a plate 600 mm × 900 mm, if the cutting speed is 6 m/min. The return time to cutting time ratio is 1 : 4 and the feed is 2 mm/stroke. The clearance at each end is 75 mm.　　　　　　(10)

7a) What is 'Powder metallurgy' ? Mention its importance in manufacturing.　　　　　　(2+4)

b) Explain the different steps followed in powder metallurgy process.　　　　　　(8)

c) Mention advantages and limitations of powder metallurgy.　　　　　　(6)

8. Write short notes (any four):　　　　　　(4 × 5)

a) Flow production system

b) Selection of production system

c) Interchangeability

d) Wear allowance in gauge design

e) Break-even point

f) Sintering in powder metallurgy