BME-011

BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING)

00386

Term-End Examination

June, 2010

BME-011 : COMPUTER AIDED PROCESS PLANNING

Time : 3 hours   Maximum Marks : 70

Note : Attempt any seven questions. Answer data not supplied can be assumed suitably. Use of calculator is permitted.

1. (a) Given the increasing importance of environmental concerns, how would a company incorporate these issues into the make-or-buy process ? Give two examples to illustrate your views.   2x5=10

   (b) Briefly explain the steps in automatic process planning with the help of suitable examples.

2. (a) Describe in brief the factors influencing the selection of tools.   2x5=10

   (b) Find speed for 3 hours tool life for dry machining for free cutting mild steel with HSS tool. Given : $C = 74$, and $\eta = 0.10$

3. (a) In a metal cutting experimentation the tool life was found to vary with the cutting speed in the following manner. **2x5=10**

Cutting Speed V, (m / min)	Tool Life T, (min)
100	120
130	50

Derive the Taylor's tool life equation for this operation and estimate the tool life at a speed of 2.5 m/s. Also estimate the cutting speed for a tool life of 80 minutes.

(b) A carbide tool while machining a MS workpiece was found to have a life of 1 hour and 40 minutes when cutting at 50 m/min. Find out life if tool is to operate at speed 30% higher than previous one. Also calculate cutting speed if tool is required to have a life of 2 hours and 45 minutes. Assume $\eta = 0.28$

4. (a) Calculate the drilling speed if a 60 mm diameter hole of 70 mm depth is to be drilled in M. S. component. The feed rate is 0.27 mm/rev and the material removal rate (MRR) is 200 cm³/min. Also calculate the machining time. **2x5=10**

Given : Break through distance $= \dfrac{D}{2 \tan \alpha}$,

(usually $\alpha = 59°$)

(b) Calculate the time required for a turning cut of 60 mm length, if feed rate is 0.12 mm/rev and spindle speed is 200 rpm.

5. (a) List the advantages of forging of metals. Why is press forging preferred over hammer forging process ? **2x5=10**

(b) Calculate the cutting speed when a workpiece of 160 mm dia is being turned. The spindle speed being 300 rpm.

6. (a) Explain how a tube can be manufactured from sheet by a suitable welding processes.

(b) Describe in brief the various techniques of material selection. **2x5=10**

7. (a) Explain in brief the scope of automating the process planning function in assembly and welding process. **2x5=10**

(b) The turret lathe section has eight machines, all devoted to the production of the same part. The section operates 12 shifts/week. The number of hours per shift averages 8.0. Average production rate of each machine is 18 unit/hr. Determine the weekly production capacity of the turret lathe section.

8. (a) With reference to part print analysis, explain what is meant by the degree of symmetry and the degree of relationship between surfaces. Give examples to support your answer. **2x5=10**

(b) A through hole of 45 mm diameter and 60 mm depth is to be drilled in a mild steel component. The cutting speed can be taken as 75 m/min and the feed rate as 0.30mm/rev. Calculate the machining time and the material removal rate.

Given : Break through Distance $= \dfrac{D}{2 \tan \alpha}$

(Usually $\alpha = 59°$)

9. (a) What are the desirable characteristics of a cutting tool material ? Explain how these are satisfied in the case of high speed steel tools. **2x5=10**

(b) The specifications for a critical characteristics of an electric resistor call for it to have a resistance of 500 ± 25 ohms. The process for making the resistors produces a normal distribution of measurements of resistance with a standard deviation of 5 ohms.

(i) Calculate C_p for this situation.

(ii) Is the process capable of performing the operation successfully ?

10. Write short notes on *any four* of the following :

                                                         4x2½=10

    (a)   Group Technology

    (b)   Ploy code system of classification

    (c)   Tool cost

    (d)   Interference

    (e)   Plastics

    (f)   Runner

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