aktuonline.com
aktuonline.com

Printed Pages – 4

ME – 504

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 4017 **Roll No.**

B.Tech.

FIFTH SEMESTER EXAMINATION, 2004-2005

MANUFACTURING SCIENCE - II

Time : 3 Hours *Total Marks : 100*

Note : *(i) Attempt **ALL** the questions.*

(ii) All questions carry equal marks.

1. Answer ***any three*** of the following :– **[5x3=15]**

(i) How is metal removed in metal cutting ? Explain the process by giving any simple model to explain the metal removal process.

(ii) What is meant by Built-Up-Edge (BUE) ? With a neat sketch explain the formation of a BUE. Explain the conditions which promote the growth of BUE along with its consequences.

(iii) How do you define tool life ? Explain the parameters that control the tool life of a single point cutting tool.

(iv) What are basic requirements of cutting fluids in metal machining ? Explain with their main applications.

(v) What are the factors that control surface finish in turning ? How do you select the cutting process parameters for finish turning ?

aktuonline.com

aktuonline.com aktuonline.com

b) A 600mm long job of diameter 150mm of AISI 4140 steel is to be turned with a depth of cut of 1.5mm and feed rate 0.25mm per revolution. The other data are as following : [5]

Labour cost per hour = Rs.12.00

Machine overhead per hour = Rs.40.00

Grinding cost per hour = Rs.15.00

Grinding Machine overhead per hour = Rs.50.00

Idle time =5 minutes

Taylor's tool life equation is given by $VT^{0.22}=475$

Tee operation is carried out using tungsten carbide brazed tools with following details.

Initial cost = Rs.60.00

Grinding time=5 minutes per edge

Tool change time =2 minutes and there are 9 grinds per tool before salvage.

Find the optimum cutting speed, tool life and the cost of operation using the criteria of minimum production cost. Assume any missing data, if needed.

Answer **any three** of the following : [5x3=15]

(i) What are the differences between an automobile lathe and a capstan lathe ? Give an example of a component suitable for a capstan lathe with dimensions.

(ii) What are the types of lathes you are familiar with ? State their applications.

aktuonline.com

aktuonline.com aktuonline.com

(iii) Compare a shaper and planer in terms of their operation and type of work pieces.

(iv) Define milling. What are the various work holding devices used in milling ? Explain their relative applications and disadvantages.

(v) Explain the different types of holes commonly used in engineering components and the processes used to produce them.

(b) A 100 mm diameter cutter having 8 teeth , cuts steel at 30 m/min. [5]

The depth of cut is taken as 4mm and the table feed rate is 150mm/min. Find the length of the chip in up and down milling operations.

Answer **any two** of the following : **[10x2=20]**

(i) What are the important factors which need to be considered for specifying a grinding wheel ? Explain with suitable examples.

(ii) What is the classification method that could be used for grinding machines ? Give the applications of each variety of grinding machines.

(iii) Discuss briefly :

(a) Automation.

(b) Dressing and Turning of grinding wheels.

aktuonline.com

aktuonline.com aktuonline.com

4. Answer **any two** of the following: **[10x2=20]**

(i) Distinguish between the following ;

(a) Spot & Seam Welding,

(b) Gas Welding & Gas Cutting

(ii) (a) Why is it normally necessary to use filler material in welding with tungsten arc ? Give reasons.

(b) How is an arc obtained in arc welding ? How do you specify an electric arc welding power source ? Explain.

(ii) Write short notes on the following ;

(a) Friction welding

(b) Welding defects

5. Answer **any two** of the following : **[10x2=20]**

(i) (a) Explain the application of the following electrode materials in EDM: Copper & Graphite.

(b) Briefly explain the working of an USM machine showing important elements.

(ii) (a) What are the important parameters that control the material removal rate in AJM? Briefly explain about any two factors.

(b) Explain the advantages and disadvantages of USM.

(iii) Write short notes on the following ;

(a) Plasma arc welding

(b) Explosive welding.

aktuonline.com