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Printed Pages – 4 **TME – 504**

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

PAPER ID : 4077 Roll No. | | | | | | | | | | |

B.Tech.

FIFTH SEMESTER EXAMINATION, 2006 - 07

MANUFACTURING SCIENCE - II

Time : 3 Hours *Total Marks : 100*

Note : *(i) Answer ALL questions.*

(ii) All questions carry equal marks.

(iii) In case of numerical problems assume data wherever not provided.

(iv) Be precise in your answer.

1. (a) Explain any three of the following : **(4x3=12)**

(i) Continuous chip with BUE

(ii) Tool-Life

(iii) Flank wear and Crater wear

(iv) Machinability

(v) Cutting fluid

(b) Explain Merchant's force circle diagram and derive the following Merchant's shear angle relationship. **(8)**

$2\phi + \beta - \alpha = \pi/2.$

where ϕ is the shear angle, β is the friction angle and α is the rake angle.

OR

The following data relates to an orthogonal turning process :
Chip thickness = 0.56 mm
Feed = 0.2 mm/rev
Rake angle = 10°
Calculate :

(i) Chip thickness ratio and chip reduction coefficient
(ii) Shear angle
(iii) Shear strain involved in the deformation process

2. (a) Differentiate any three of the following : **(4x3=12)**
(i) Turret lathe and Capstan lathe
(ii) Shaper and planner
(iii) Compound and differential indexing
(iv) Single point and multipoint tool
(v) Horizontal and Vertical Milling Machine

(b) Explain giving reasons the effect of rake angle, clearance angle, side cutting edge angle and nose radius on 'tool life'. Which one affect tool life most, the uncut thickness (feed) or width of cut and why ? **(8)**

3. (I) Attempt *any two* parts of the following : **(5x2=10)**
(a) How grinding wheels specified ? Clearly differentiate between grade and structure of a grinding wheel.
(b) Explain any two of the following :
(i) Up Milling and Down Milling.
(ii) Tapping and Honing
(iii) Reaming
(c) Discuss the wear mechanism of grinding wheel.

(II) Explain *any two* parts of the following : **(5x2=10)**

(i) Centerless grinding

(ii) Dressing and Truing

(iii) Super finishing

4. Attempt *any two* parts of the following : **(10x2=20)**

(a) Distinguish between the following :

(i) Gas Welding and Gas Cutting

(ii) TIG Welding and MIG Welding

(b) (i) What is 'Arc blow' ? Explain the causes of Arc blow. How is the Arc blow problem in A.C. welding taken care of ?

(ii) What is Heat Affected Zone (HAZ) ? How it affects the weldment ?

(c) Write short notes on the following :

(i) Atomic hydrogen welding process

(ii) Submerged arc welding process

5. Attempt *any two* parts of the following : **(10x2=20)**

(a) Write short notes on the following :

(i) Explosive welding

(ii) Ultrasonic welding

(b) (i) Explain the mechanics of material removal in Electro-Chemical Machining (ECM) process.

(ii) What is Electro-Discharge Machining (EDM) process ? Obtain the expression of material removal rate in EDM process in terms of the process parameters.

(c) (i) What is Plasma Arc Welding Process ? Give suitable diagram. Explain its working and also give its field of applications.

(ii) What is Laser Beam Machining (LBM) process. With the help of a suitable sketch, explain its working. Also give scope of Laser Beam Machining application.

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