

**B.Tech. MECHANICAL ENGINEERING
(COMPUTER INTEGRATED
MANUFACTURING) /
(BTMEVI)**

Term-End Examination

00632

December, 2017

BME-008 : MACHINING TECHNOLOGY

Time : 3 hours

Maximum Marks : 70

Note : *Question no. 8 is compulsory. Answer any four questions from the remaining. Use of scientific calculator is allowed.*

1. Draw a force circle diagram proposed by Merchant for orthogonal cutting conditions showing different forces acting on tool, chip, and work system. From the diagram, derive the expressions for

(a) shearing force on the shear plane, and

(b) friction force on the tool face,

in terms of cutting forces, thrust forces, rake angle and shear angle.

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2. (a) How is grinding different from other machining operations ? How will you specify a grinding wheel ? A grinding wheel carries the following marking :
- “W A 36 K 5 R 17”
- What does this signify ? 8
- (b) Define Bond. What are the different types of bonds in the manufacturing of grinding wheels ? 6
3. (a) Describe the centreless grinding process. What are the various feeding methods used in centreless grinding ? Explain. 8
- (b) Write a brief note on Polishing and Buffing operations. 6
4. (a) Classify the surface improvement techniques and explain each of them in brief. 7
- (b) Explain the working principle of EBM process. Can you make a 10 mm diameter hole using EBM ? Justify your answer. 7
5. (a) Explain with the help of a figure, the reasons for the decrease in finishing rate in μ -honing with time. Do you think it will become almost zero after a certain period of time ? 7

- (b) What do you understand by Sputtering yield ? What is Cascade type effect ? Explain with the help of a figure. 7
6. (a) Write in brief about production of a LASER beam and the working principle of LBM. 7
- (b) With the help of a neat sketch, explain the mechanism of material removal in EDM. 7
7. (a) Derive an equation for the maximum permissible feed rate during ECM. Also deduce the relationship for electrolyte temperature change for a given feed rate of tool. 10
- (b) What is Horn and Acoustic Head in USM ? Explain. 4
8. (a) During orthogonal turning of a pipe of 95 mm diameter, the rake angle of the tool was 25° . The ratio of the cutting force to feed force was 4.0. The feed rate, depth of cut and chip thickness ratio were 0.280, 0.680 and 0.5 respectively. With the help of a dynamometer, feed force was measured as 480 N. Workpiece was rotating at 460 revolutions per minute. Determine chip velocity, shear strain, shear strain rate and mean width of PSDZ. 10

- (b) The following data was obtained in a tool wear test carried out during turning :

Time (min)	0	5	10	15	20
Flank wear (mm) for $V = 60$ m/min	0	0.37	0.50	0.68	0.80
Flank wear (mm) for $V = 80$ m/min	0	0.60	0.83	0.87	1.30

Determine approximate tool life (no calculation is allowed) for a cutting speed of 72 m/min if 0.80 mm flank wear is the tool failure criterion.

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