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BME-008

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BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING) (BTMEVI)

Term-End Examination

June, 2012

BME-008 : MACHINING TECHNOLOGY

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **any five** questions.*

1. (a) Give the classification of cutting tools. With the help of labelled diagram, describe different elements and angles of single point cutting tool. **8+6**

(b) Give four examples each of orthogonal cutting and oblique cutting.

2. (a) What are different methods used to experimentally estimate the tool chip interface temperature in metal cutting ? Describe any two briefly. **7+7**

(b) Name different variables affecting tool life. What are the desirable properties of a cutting tool material ? What is 'Cermet' ? Is it better in comparison to its competitive tool material - cemented carbide ?

3. (a) Explain various bonding materials used in a grinding wheel. Discuss the guidelines useful in its selection for different types of work materials. 7+7

(b) What are different abrasives used in a grinding wheel ? Name and discuss different grinding wheel defects. How do you select a grinding wheel for a given application ?

4. (a) With the help of neat sketch describe centreless grinding. Give its applications, advantages and disadvantages. 7+7

(b) List various advanced finishing processes. Briefly describe the lapping and burnishing operations with their applications.

5. What is 'surface integrity' ? How is it classified ? Explain each under different category. How is 'surface roughness' different from 'surface waviness' ? How is surface roughness measured and represented ? 14

6. (a) Discuss the effects of the following parameters on the rate of metal removal and surface finish obtainable in ultrasonic machining. 7+7

(i) Amplitude and frequency of vibration

(ii) Abrasive grain size

(iii) Static load.

(b) Derive a theoretical relationship for the determination of the metal removal rate in ECM.

7. In orthogonal turning operation +12° back rake angle tool, the following observations were made **14**

Cutting speed =170 m/min

Width of cut =3.5 mm.

F_c =190 kgf, F_t=60 kgf.

Deformation Chip thickness=0.37 mm.

Tool Chip Contact length =0.73 mm and Feed rate=0.25 mm/rev.

Determine the following :

(a) Chip thickness ratio

(b) Shear Angle

(c) Friction angle

(d) Resultant force

(e) Shear force and

(f) Shear strain.

8. (a) Classify unconventional machining processes on the basis of the type of energy employed. Also, state the mechanism of metal removal, tools and energy sources used. **7+7**

(b) Draw a sketch showing the effect of carrier gas pressure on MRR during Abrasive Jet Machining (AJM). Why is AJM not recommended to machine ductile materials ?