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BME-008

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

00565

Term-End Examination

December, 2014

BME-008 : MACHINING TECHNOLOGY

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any* ***five*** *questions. All questions carry equal marks. Use of calculator is permitted.*

1. (a) Differentiate between orthogonal cutting and oblique cutting. 7

(b) Mild steel rod is being turned at the speed of 29·6 m/min. Feed rate used is 0·32 mm/rev and deformed chip thickness is equal to 0·40 mm. Rake angle and shear angle of the tool are 20° and 30°, respectively. Calculate the shear flow velocity. 7

2. (a) Name the different sources of heat generation in metal cutting. Show that for orthogonal machining with zero rake angle tool, the rate of heat generation in metal machining (PSDZ) can be expressed as

$$\frac{F_c V_c (1-\mu r_c)}{J}$$

where, F_c = Cutting force

V_c = Cutting speed

μ = Coefficient of friction

r_c = Chip thickness ratio

J = Mechanical equivalent of heat. 7

(b) Differentiate between abrasion wear and adhesion wear. 7

3. (a) Write an equation that can express the effects of cutting speed, feed and depth of cut on tool life. Comment on their relative effect on tool life. 7

(b) Calculate the cutting speed at which the tool would work satisfactorily for 3 hours. Following data is available for the tool work combination :

Tool life = 2 hours, V = 4·5 m/min, n = 0·2 7

4. (a) A grinding wheel carries the following marking :

39-C-120-K-4-V

What does this signify ? 7

(b) With the help of a suitable sketch describe the working and application of centreless grinding. 7

5. (a) Explain the working principle of honing, lapping and superfinishing. 7

(b) Describe the burnishing operation. Give suitable application. 7

6. (a) With the help of a suitable sketch, describe Abrasive Jet Machining (AJM). Give its process capabilities and applications. 10

(b) Explain in brief the process capabilities and applications of Ultrasonic Machining (USM). 4

7. (a) With the help of a suitable sketch describe the mechanics of metal removal in Electric Discharge Machining (EDM). What are the elements of wire EDM machine tool ? 10

(b) Write the working principle of LASER Beam Machining (LBM). 4

8. Write short notes on any ***two*** of the following : *2×7=14*

(a) Cutting Tool Materials

(b) Dressing, Truing and Balancing of grinding wheel

(c) Plasma Arc Cutting