Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |  |
| **Code :** | **14ME2046** | **Duration :** | **3hrs** |  |
| **Sub. Name :** | **METAL CUTTING THEORY AND PRACTICE** | **Max. marks :** | **100** |  |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Explain the mechanism of chip formation in ductile and brittle materials. | CO1 | 10 |
| b. | During machining of C 20 steel with a triple carbide cutting tool 0-8-6-7-10-70-1 mm ORS shape, the following data were obtained: feed=0.18mm/rev, depth of cut =2 mm, cutting speed= 120 m/min, chip thickness = 0.4 mm. Determine chip thickness ratio and shear angle. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Draw a neat sketch of a single point tool and explain its tool signature in ASA system. | CO2 | 20 |
| 3. | a. | Discuss the Broach tool nomenclature with a neat sketch. | CO3 | 10 |
|  | b. | During machining 18mm bar on a lathe at a cutting speed of 110m/min the life of tool is found to be 60 minutes. If n=0.2, calculate the speed at which the spindle should be run to give a tool life of 5 hours. If a length of 50mm per component is machined, what is the cutting time per piece and how many pieces can be produced between tool changes? If the feed used is 0.15mm/rev. | CO4 | 10 |
| (OR) | | | | |
| 4. | a. | Explain the nomenclature of a drilling tool with a neat sketch. | CO2 | 10 |
|  | b. | Discuss the various forces acting on a milling tool with neat sketches. | CO2 | 10 |
| 5. | a. | Explain the construction and working of a piezoelectric dynamometer used for measuring cutting force. | CO3 | 15 |
|  | b. | What are the assumptions made in Lee and Shaffer’s theory? | CO2 | 5 |
| (OR) | | | | |
| 6. | a. | Taylor’s tool life equation for cutting HSS steel is given by VTn = C, where n and C are constants. The observations noted are  V(m/min) 25 35  T(min) 90 20  Calculate the cutting speed for a desired tool life of 60 min. | CO4 | 10 |
|  | b. | Explain the several cutting tool materials in detail. | CO4 | 10 |
| 7. | a. | Explain different types of tool failure and mechanism of tool wear with a neat sketch. | CO5 | 20 |
| (OR) | | | | |
| 8. | a. | What are the required properties of cutting fluids? | CO3 | 10 |
|  | b. | Discuss the composition, applications, merits and demerits of different cutting fluids. | CO3 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | What are the effects of chatter? Discuss the factors affecting machine tool chatter. | CO5 | 15 |
|  | b. | Explain the various methods to eliminate chatter. | CO5 | 5 |

ALL THE BEST