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



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18ME3011** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED METAL CUTTING THEORY** | **Max. Marks :** | **100** |

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| **Q. No.** | **Sub Div.** | **Questions** | **Course Outcome** | **Marks** |
| **ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)** | | | | |
| 1. | a. | Explain briefly cutting force during machining. Discuss the effect of cutting force on machining performance. | CO1 | 6 |
| b. | Derive the expression for Merchant's theory and highlight its salient features. | CO3 | 10 |
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| 2. | a. | Why the different systems of tool nomenclature and conversion of rake angles required? Discuss the following in detail with neat sketches:  (i) ASA System, (ii) ORS System, (iii) NRS System. | CO4 | 12 |
| b. | With simple sketch, explain the nomenclature of a drill tool. | CO1 | 4 |
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| 3. | a. | Describe why cutting fluids usage is to be reduced during machining? List the new techniques employed in metal cutting operation to limit the usage of cutting fluids? | CO2 | 8 |
| b. | Explain the effect of various parameters on cutting temperature developed during machining. | CO4 | 6 |
|  | c. | Write short notes on 'Hot Machining'. | CO1 | 2 |
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| 4. | a. | Describe the cutting tool materials and their required properties which makes them suitable for metal cutting. | CO6 | 6 |
| b. | The coated cutting tool have enhanced tool life and improve machinability. Justify. | CO4 | 4 |
| c. | Considering carbide tool as an example and using the equation for mean temperature in turning on a lathe, determine amount of feed to be reduced in order to keep the mean temperature constant when the cutting speed is doubled. | CO5 | 6 |
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| 5. | a. | List the different methods and techniques used for measuring the cutting forces. Explain any two in detail. | CO5 | 10 |
| b. | Discuss briefly the machinability and machinability index. | CO1 | 6 |
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| 6. |  | Discuss the factors that affect the tool life during machining operation. Explain the influence of the different cutting fluids in enhancing tool life. | CO4 | 16 |
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| 7. | a. | Sketch and explain the forces acting in drilling, milling operation. Explain them with respect to the surface integrity aspects. | CO1 | 12 |
| b. | Discuss briefly "Economics of Machining" | CO2 | 4 |
|  | | **COMPULSORY QUESTION (1 x 20 = 20 Marks)** |  |  |
| 8. | a. | Taking a suitable example and discuss how cutting tool wear can be mathematically modeled using different approaches. List the benefits that can be achieved through such modeling. | CO2 | 15 |
| b. | Discuss the following:  (i) Wear-land  (ii) Crater wear. | CO1 | 5 |