

Code No: RT31032

R13**SET - 1**

III B. Tech I Semester Supplementary Examinations, May - 2018
METAL CUTTING & MACHINE TOOLS
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

- |   |    |                                                                                |      |
|---|----|--------------------------------------------------------------------------------|------|
| 1 | a) | What is rake angle? What is the effect of nose radius in tools?                | [3M] |
|   | b) | What are the advantages of automatic lathes?                                   | [3M] |
|   | c) | State the difference between a vertical shaper and a slotter?                  | [4M] |
|   | d) | How do you specify the grinding wheel? and explain it                          | [4M] |
|   | e) | Mention four important factors that influence the selection of grinding wheel? | [4M] |
|   | f) | Mention the main differences between CNC and NC?                               | [4M] |

**PART -B**

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|---|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 2 | a) | Explain the various tool materials.                                                                                                                                                                                                                                                                                                                                                               | [8M] |
|   | b) | In an orthogonal cutting test with a tool of rake angle $10^\circ$ , the following observations were made:<br>Chip thickness ratio : 0.3<br>Horizontal component of the cutting force = 1290 N<br>Vertical component of the cutting force = 1650 N<br>From Merchant's theory, calculate the various components of the cutting forces and the coefficient of friction at then chip tool interface. | [8M] |
| 3 | a) | Explain any four commonly used attachments on lathe.                                                                                                                                                                                                                                                                                                                                              | [8M] |
|   | b) | Explain the tooling layout for the production of a Hexagonal bolt in a capstan lathe.                                                                                                                                                                                                                                                                                                             | [8M] |
| 4 | a) | Describe wit h a schematic sketch the operation of hydraulic shaper.                                                                                                                                                                                                                                                                                                                              | [8M] |
|   | b) | Describe with block diagram jig boring machine.                                                                                                                                                                                                                                                                                                                                                   | [8M] |
| 5 | a) | Describe the construction of dividing head giving the applications for which it can be used                                                                                                                                                                                                                                                                                                       | [8M] |
|   | b) | What are the differences between compound indexing and differential indexing? Explain the relative merits.                                                                                                                                                                                                                                                                                        | [8M] |
| 6 | a) | Explain any one finishing operation with neat sketch.                                                                                                                                                                                                                                                                                                                                             | [8M] |
|   | b) | Discuss various types of abrasive materials used in grinding wheel.                                                                                                                                                                                                                                                                                                                               | [8M] |
| 7 | a) | State a few typical applications where the use of numerical control would be justified.                                                                                                                                                                                                                                                                                                           | [8M] |
|   | b) | What are the common types of drilling jigs? How does a template jig differ from a plate jig?                                                                                                                                                                                                                                                                                                      | [8M] |

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