

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

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Fifth Semester B.Tech Degree Regular and Supplementary Examination December 2020

**Course Code: ME303****Course Name: MACHINE TOOLS AND DIGITAL MANUFACTURING**

Max. Marks: 100

Duration: 3 Hours

**PART A***Answer any three full questions, each carries 10 marks.*

Marks

- |   |   |      |
|---|---|------|
| 1 | a) A tool shape specification as per ASA system is 9-15-7-7-21-12-5. Draw three views of given tool and mark various angles   | (6)  |
|   | b) What are the uses of cutting fluids in metal cutting?  | (4)  |
| 2 | Following data were observed during an orthogonal turning process. Tangential force 1000 N, feed force 500N, tool rake angle $12^\circ$ and chip thickness ratio 0.368. Find shear force developed and coefficient of friction. Draw the Merchant circle diagram. | (10) |
| 3 | a) Explain the working of Apron mechanism in lathe with a neat sketch.  | (6)  |
|   | b) What are the functions of tail stock in lathe machine?   | (4)  |
| 4 | a) With a neat sketch explain the nomenclature of twist drill.  | (6)  |
|   | b) Differentiate between boring and reaming operations.   | (4)  |

**PART B***Answer any three full questions, each carries 10 marks.*

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|---|---|------|
| 5 | a) A shaping machine operated with a cutting speed of 16 m/min completes its return stroke in $144^\circ$ rotation of crank. Calculate the minimum cutting time required to machine a surface of 320mm x 320mm size with a feed of 2mm per double stroke. | (6)  |
|   | b) Compare horizontal shaper and travelling head shaper.  | (4)  |
| 6 | Explain the principle parts of a planing machine with neat sketch.  | (10) |
| 7 | Write the names of various types of milling machines. Explain any ONE type with neat sketch.  | (10) |
| 8 | a) Explain end milling, face milling and fly cutting in milling machine with sketches.  | (6)  |

**PART C**

*Answer any four full questions, each carries 10 marks.*

- 9 Explain grinding wheel parameters which influence grinding performance. (10)
- 10 a) Explain honing operation with sketch. (6)
- b) Differentiate between dressing and truing. (4)
- 11 a) Name different types of broaching tools used for broaching operation. Explain any one with sketch. (6)
- b) Write any four differences between capstan and turret lathe. (4)
- 12 With the help of figure, explain the concept of digital manufacturing. (10)
- 13 Draw the organization structure model of digital manufacturing system and explain. (10)
- 14 Explain GRAI modelling in Digital Manufacturing with suitable sketches. (10)

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