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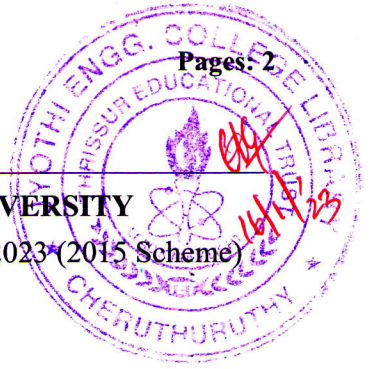
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Reg No.: \_\_\_\_\_

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Fifth Semester B.Tech Degree (S, FE) Examination January 2023 (2015 Scheme)



**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 10marks.*

Marks

- 1 a) Draw three views of single point cutting tool and show the tool signature of (6)  
8- 14 - 6 - 6 - 15 - 1/8.
- b) Explain the three heat generating zones in metal cutting operation with neat (4)  
sketch.
- 2 a) During turning of a steel rod by a given cutting tool at given machining (6)  
conditions, the tool life decreases from 60 min to 20 min due to increase in  
cutting velocity from 60 m/min to 120 m/min. At what cutting velocity the life of  
that tool under the same condition and environment will be 30 min?
- b) Why oblique cutting is preferred in metal cutting processes. (4)
- 3 a) Draw a block diagram of lathe and mark important parts. (6)
- b) With a neat sketch explain the method of generation of long and small taper in a (4)  
centre lathe
- 4 a) A hole of 15 mm diameter is to be drilled on a work piece of 50 mm thickness. (6)  
The suggested feed is 0.2 mm/rev and the cutting speed is 35 m/min. Assume  
approach and over travel length as 4.5 mm and 5 mm respectively. Calculate the  
spindle rpm, material removal rate and machining time.
- a) Explain any two operations performed in drilling machine other than drilling. (4)

**PART B**

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

- 5 a) Explain the important parts of shaper with a block diagram. (7)
- b) Determine the machining time required for machining a surface of dimensions (3)  
500 X 500 mm on a shaping machine. The cutting speed is 8.0 m/min, return to

cutting time ratio is 2:3, feed is 2 mm/double stroke and the clearance at each end is 20 mm.

- 6 a) Explain how to cut an internal keyway using a vertical slotter. (5)  
b) Explain any two work holding devices used in planer with sketches. (5)
- 7 a) Explain any two milling operations with neat diagrams (5)  
b) Explain any two cutters used in milling machine with neat sketches. (5)
- 8 a) Define indexing in milling machine. Explain simple indexing method with suitable example. (5)  
b) How machining time is calculated in milling operation. Write the equation and explain the terms. (5)

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

- 9 a) With suitable example show the marking system of grinding wheel and explain each term (5)  
b) Explain the three elements of a grinding wheel (5)
- 10 a) Differentiate hand lapping and machine lapping operations. (5)  
b) How a turret lathe differs from a capstan lathe (5)
- 11 a) Explain different types of abrasives used for making a grinding wheel (6)  
b) Explain any two types of dressers used for dressing operation. (4)
- 12 a) Write the procedure involved in operation reference mode of digital manufacturing. (6)  
b) What are the benefits of digital manufacturing system over conventional manufacturing system (4)
- 13 a) With the help of a suitable diagram explain the modeling process of the generalized model and its specific meaning. (10)
- 14 a) Discuss IDEF0 top-down modeling process with neat sketch. (6)  
b) Discuss the decision-making activities of GRAI network with a diagram (4)

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