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Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (S, FE) / S3 (PT) (S,FE) Examination June 2024 (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 10 marks.   Marks

1 a) With a neat sketch describe the nomenclature of single point cutting tool.   (5)

   b) What is the need of chip breakers? Discuss about different types of chip breakers   (5)
       in use.

2 a) Derive an equation to determine the frictional force and its normal component   (5)
       using the Merchant's circle diagram. Also show how coefficient of friction is
       determined.

   b) Explain the crater wear and flank wear of a cutting tool with sketches.   (5)

3 a) How lathes are classified? Give the purposes of tool room and automatic lathes.   (5)

   b) What is the function of chuck in a lathe? Explain the applications and limitations   (5)
       of a collect chuck.

4 a) Discuss the nomenclature of twist drill with a neat diagram.   (5)

   b) Describe the taper turning by tail stock set over method with the advantages and   (5)
       limitations.

PART B

Answer any three full questions, each carries 10 marks.

5 a) Define the necessity of quick return mechanism used in a shaper. What are the   (10)
       different quick return mechanisms in use? Explain any one type with neat
       diagrams.

6 a) Discuss the classification of planning machines and write about the applications   (5)
       of each type.

   b) Explain the different work holding devices used with a slotting machine.   (5)

7   a)   Define indexing in a milling machine. Describe the construction and working of   (10)
         universal dividing head with neat diagram. Explain the procedure of simple
         indexing with an example.

8   a)   With a neat diagram explain the nomenclature of a slab milling cutter.   (5)

    b)   Describe the straddle milling operation and gang milling operation with neat   (5)
         diagrams.

PART C

Answer any four full questions, each carries 10 marks.

9   a)   Write a note on abrasives used in grinding wheels.   (5)

    b)   Describe the construction and working of a centreless grinding machine.   (5)

10 a)   Explain the working principle, applications and advantages of the following   (10)
         processes with neat sketches.
         i)   Lapping
         ii) Honing

11 a)   What is glazing and loading of grinding wheel? Explain how it is rectified.   (5)

    b)   Discuss the differences between turret type and swiss type automatic machines. (5)

12 a)   Prepare a detailed note on the architecture of digital manufacturing with the key   (10)
         technologies involved and diagrams.

13 a)   How digital manufacturing defers from conventional manufacturing? Explain   (5)
         with an example.

    b)   What is petri Net? Discuss its advantages and disadvantages.   (5)

14 a)   Describe the following critical modelling theories and technologies of digital (10)
         manufacturing science with sketches.
         i)   GRAI Modelling method
         ii) CIMOSA

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