

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FIFTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018**

**Course Code: ME303**

**Course Name: MACHINE TOOLS AND DIGITAL MANUFACTURING (IE, ME)**

Max. Marks: 100

Duration: 3 Hours

*Expected length of answers:*

*In 7-mark questions: Neat sketches and 10 to 15 sentences with exact points.*

*In 3-mark questions: 3 to 6 sentences with exact points, use sketches if mentioned in question.*

**PART A**

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

Marks

- |   |  |     |
|---|--|-----|
| 1 | a) A single point cutting tool A is having tool life index 0.32 and machining constant 40 and another tool B is having tool life index 0.4 and machining constant 85. Find out the speed at which both tools are having same tool life. With help of graph explain which tool is suitable for machining with a speed of 3 m/s. | (7) |
|   | b) Draw three views of a single point cutting tool and mark cutting angles used in tool signature.   | (3) |
| 2 | a) What is meant by high efficiency range of cutting speed? With the help of graph explain how it is obtained.   | (7) |
|   | b) In an orthogonal cutting, cutting force is 300 N and feed force is 120 N. If chip thickness ratio is 0.6 and rake angle is $20^\circ$ find shear force.   | (3) |
| 3 | a) Draw a neat sketch of carriage of a lathe and write the functions of each part.   | (7) |
|   | b) Name any three operations which can be carried out in lathe with tool held in tailstock.  | (3) |
| 4 | a) With a neat sketch, explain various operations performed in drilling machine.   | (7) |
|   | b) Differentiate between twist drill and straight flute drill.   | (3) |

**PART B**

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

- |   |   |     |
|---|---|-----|
| 5 | a) In a shaper operated with crank and slotted link quick return mechanism, one of the strokes is taken place, when crank rotate $72^\circ$ . Calculate the time to shape with one pass, over the surface of a plate 500 x 900 mm size when the cutting speed is 10 m/min if feed is 3 mm and clearance at each end is 70mm. The cut is taken place along 500mm side. | (7) |
|   | b) What are the differences of travelling head shaper from other shapers?   | (3) |
| 6 | a) Which are the different types of planer machines? Explain any TWO with its special uses.   | (7) |
|   | b) Write any three uses of slotter machine.   | (3) |
| 7 | a) Draw a plain milling cutter and mark its parts and angles. Write the functions of each part and angles.  | (7) |
|   | b) Differentiate between upmilling and down milling with sketches.  | (3) |

- 8 a) Which are the different milling operations? Explain any two with figures. (7)  
b) What is the reason behind generation of vibration in milling which affect the force system and reduces finish and tool life. (3)

**PART C**

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

- 9 a) Name different types of centerless grinding. Explain working of any one type with figure. (7)  
b) What is glazing and loading of grinding wheel? (3)
- 10 a) A grinding wheel is specified by W A40 L4 V18. What is the meaning of each term included in it? (7)  
b) Write any THREE differences between turret and capstan Lathe. (3)
- 11 a) What is lapping. What are its advantages. (7)  
b) What is honing. (3)
- 12 a) Define digital manufacturing. Explain its concept with help of diagram. (7)  
b) Write Three important features of digital manufacturing. (3)
- 13 a) In digital manufacturing which are the objects those need to be described by a model. (7)  
b) How bionic mechanics support to form DM science. (3)
- 14 a) Which are the activities in GRAI network? Draw the charts which describe these activities. (7)  
b) What is IDEF. (3)

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