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Code No. : 16501

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**B.E. (Mech. Engg.: CBCS) VI-Semester Main & Backlog Examinations, May-2019**

**Machine Tools and Metal Cutting**

Time: 3 hours

Max. Marks: 70

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

Q.No.	Stem of the question	M	L	CO	PO
<b>Part-A (10 × 2 = 20 Marks)</b>					
1.	Contrast automatic and semi-automatic lathes.	2	2	1	1
2.	How is the tool-work relationship in turning different from facing?	2	1	1	1
3.	Estimate the Index crank movement to cut a gear of 35 teeth.	2	3	2	2
4.	How does the process of shaping differ from slotting?	2	1	2	1
5.	Why is aluminum oxide used more frequently than silicon carbide as an abrasive?	2	5	3	1
6.	Choose a proper locating element to hold cylindrical work.	2	1	3	1
7.	Justify the use of USM for cutting holes on Glass.	2	5	4	1
8.	Why doesn't the cutting force $F_c$ increase with increased speed $V$ ?	2	6	4	1
9.	List out the important properties of a cutting fluid.	2	1	5	1
10.	How do you estimate Machinability Index?	2	1	5	1
<b>Part-B (5 × 10 = 50 Marks)</b>					
11. a)	What are the differences between automatic lathe and capstan lathe? Give an example component suited for capstan lathe with dimensions.	6	1	1	1
b)	Find the machining time to turn a workpiece of diameter 50 mm to 39 mm on a DC motor operated lathe. The permitted depth of cut in rough machining is 2 mm. The length of the work is 500 mm and the feed is 0.1 mm/rev, permitted cutting speed is 30 m/min.	4	3	1	2
12. a)	Differentiate between a shaper and planer.	6	2	2	1
b)	Estimate the Machining time to cut a single layer on a Planer. The length of the work is 1000 mm and permitted feed is 2 mm/stroke. The time taken for cutting is 20 seconds while the cutting and return time are in 3:2 ratio. The work width is 51 mm.	4	3	2	2
13. a)	What are the factors to be considered for designing a jig or a fixture? Explain with the help of sketches wherever necessary.	6	2	3	1
b)	Interpret the Marking system used to identify a Grinding wheel, how do you select one.	4	1	3	1
14. a)	Compare the performance of HSS tools and Carbide tools. Explain the significance of Chip Breakers.	6	2	4	1
b)	The cutting and thrust components of the machining force during orthogonal machining of aluminium with a rake angle of $10^\circ$ are found to be 312 N and 185 N respectively. Estimate the co-efficient of friction between the tool and chip. If the rake angle is reduced to $0^\circ$ , keeping all other parameters constant, and if the coefficient of friction also remains unchanged, estimate the new values of cutting and thrust force components using Merchant's first solution.	4	3	4	2

