Hall Ticket Number:	
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	Code No. : 16548 N/O

## VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

## B.E. (Mech. Engg.) VI-Semester Main & Backlog Examinations, May/June-2023 Metal Cutting and Machine Tools

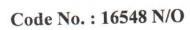
Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A  $(10 \times 2 = 20 \text{ Marks})$ 

Q. No.	Stem of the question	M	L	CC	D.
1.	List the different operations performed in a centre lathe.	-		СО	P(
2.	Differentiate between reaming and boring?	2	1	1	1
3.		2	2	1	1
4.	Compare the shaping machine tool with slotting machine.	2	2	2	1
5.	List the various gear finishing methods.	2	1	2	1
	What are the advantages of Broach tool?	2	1	3	1
6.	Enlist the various grinding machine tools.	2	1	3	1
7.	Which Unconventional process would you recommend for the following materials and state reasons?	2	2	4	1
	(i) Tool Steel (ii) Glass	os ils			
8.	Differentiate between orthogonal and oblique cutting.	2	2	4	,
9.	Which coolants would you recommend for Aluminum and Copper machining?	2	2	5	1
10.	What are the different mechanism of tool wear?	2	1	5	1
	$Part-B (5 \times 8 = 40 Marks)$				
11. a)	A 50 mm diameter grey cast iron work piece is rough turned with an carbide insert tool, the feed for the tool is 0.4 mm/rev, the depth of cut is 4 mm and the cutting speed is 8070m/min. calculate (a) the machining time (b) material removal rate (b) power and torque required by the spindle (specific cutting energy is 0.0065kW/cm <sup>2</sup> ).	5	4	1	6
b)	Differentiate between capstan and turret lathe.	3	3	1	3
2. a)	Why quick return mechanism is used in Shaper? Explain any one with suitable sketch?	4	3	2	3
	Compare and contrast gear shaping and gear hobbing with neat sketches.	4	3	2	3
3. a)	Give the specifications for the wheel to be employed for external grinding of the a shaft of 50mm diameter made of up of steel SAE 1020.	5	4	3	3
b) ]	List the various quick clamping devices used in milling and drilling?	3	2	3	3





14. a)	Explain the working of electric discharge machining with neat sketch?	3	3	4	3
b)	During the machining of mild steel with $0^{\circ} - 10^{\circ} - 8^{\circ} - 8^{\circ} - 90^{\circ} - 2$ mm ORS shaped carbide tool, the following observations were made.	5	4	4	6
	Depth of cut = 1.5 mm; feed = 0.1 mm / rev;				
	cutting speed = 100m / min; chip thickness = 0.4 mm;				
	tangential force = 300 N; axial force = 150 N.				
	Calculate				
	(i) Shear force and normal force on shear plane				
	(ii) Friction force and normal force on rake face and (iii) Kinetic coefficient of friction				
15. a)	What are the various methods available for measuring cutting tool temperature? Explain any one method to measure the temperature for milling?	4	3	5	2
b)	A coated carbide cutting tool has tool life exponent n=0.27. it gives a tool life of 60 min while machining a mild steel workpiece at a cutting speed of 120 m/min. compute the tool life if it is to be cut at a 30% higher cutting speed?	4	4	5	3
16. a)	What are the various work and tool holding devices used in Lathe? Explain their relative application.	4	1	1	3
b)	What is the use of diving head and explain its the construction.	4	2	2	3
17.	Answer any <i>two</i> of the following:				
a)	Compare and contrast between lapping and honing?	4	2	3	3
b)	What are the advantages and disadvantages of ceramics as cutting tool materials?	4	3	4	:
c)	Show diagrammatically the variation of flank wear of cutting tool with time and its importance from the tool life point of view?	4	1	5	

M: Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

; <u>`</u>	Blooms Taxonomy Level – 1	22.5%
<u>ij)</u>	Blooms Taxonomy Level – 2	31.25%
iii)	Blooms Taxonomy Level – 3 & 4	46.25%

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