Hall Ticket Number:

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 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	List the different operations performed in a centre lathe.	2	1	1	1
2.	Differentiate between reaming and boring?	2	2	1	1
3.	Compare the shaping machine tool with slotting machine.	2	2	2	1
4.	List the various gear finishing methods.	2	1	2	1
5.	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? (i) Tool Steel (ii) Glass	2	2	4	1
8.	Differentiate between orthogonal and oblique cutting.	2	2	4	1
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 × 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^2).	5	4	1	6
b)	Differentiate between capstan and turret lathe.	3	3	1	3
12. a)	Why quick return mechanism is used in Shaper? Explain any one with suitable sketch?	4	3	2	3
b)	Compare and contrast gear shaping and gear hobbing with neat sketches.	4	3	2	3
13. 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

Contd... 2

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. 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	5	4	4	6
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 ***two*** 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	3
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	3

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

i)	Blooms Taxonomy Level – 1	22.5%
ii)	Blooms Taxonomy Level – 2	31.25%
iii)	Blooms Taxonomy Level – 3 & 4	46.25%

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