

B.E. MECHANICAL ENGINEERING 3rd YEAR 1st SEMESTER EXAM 2024**MACHINING TECHNOLOGY AND METROLOGY****Time: 3 Hrs.****Full Marks: 100***Answer any five questions from the following*

- a) Explain with neat sketch different types of error in form of cylindrical surfaces and co-ordination of surfaces.
 b) What is machining accuracy? Explain maximum attainable accuracy and economically feasible accuracy with neat sketch. **12+8**

- a) Discuss the working principle of AJM and USM.
 b) An alloy contains Ni (72.5%), Cr (19.5%), Fe (5.0%), Ti (0.4%), Si (1.0%), Mn (1.0%) and Cu (0.6%). The related information about the metals is given below:

Metal	Gram atomic weight	Valency of dissolution	Density (g/cc)
Ni	58.71	2	8.90
Cr	51.99	2	7.19
Fe	55.85	2	7.86
Ti	47.90	3	4.51
Si	28.09	4	2.33
Mn	54.94	2	7.43
Cu	63.57	1	8.96

Calculate the MRR in cm³/min when a current of 1000 A is passed in ECM process.
 Use the lowest valency of dissolution.

10+10

- a) Discuss about HSS and carbide as tool material.
 b) A single point turning tool is designated as: 9°-9°-7°-7°-28°-26°- 0 mm (ASA). Sketch the views of the tool to show all the relevant features of it.
 c) Discuss the different modes of tool failure. **6+8+6**

- a) How is a lathe specified?
 b) Cast iron and mild steel job are to be machined in a lathe by using HSS and cemented carbide tools. The diameter of job varies from 30 mm to 75 mm. Assuming suitable cutting speeds, determine the speeds of a nine speed gear box considering both AP and GP variation of speeds.

5+15

- a) Explain shortly with diagram: drilling, boring and reaming.
 b) Write difference between up milling and down milling.
 c) Compare between reciprocating types machine tools: shaper, slotter and planner.

6+6+8

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6. a) Write the specification of a grinding wheel.
b) What is meant by loading and glazing of grinding wheel?
c) Discuss four types of machining operations that can be performed in lathe with neat sketch.
8+4+8
7. a) State the different components of a surface texture.
b) Show different types of flat surface and smooth surface.
c) What are reasons for controlling surface roughness?
d) Discuss the different types of surface roughness assessment.
3+4+5+8
8. a) Discuss two different wire diameter (pitch) measurement methods.
b) Draw and explain Eden-Rolt millionth comparator.
8+12
9. a) Write down the specification of shaper.
b) Discuss with neat sketch straddle milling, gang milling, face milling and peripheral milling operation.
4+16

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