



B.E DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Third Semester

MECHANICAL ENGINEERING

U18MEI3201: Metal Cutting and Computer Aided Manufacturing

COURSE OUTCOMES

- CO1: Apply the fundamentals of metal cutting and cutting tool materials
 CO2: Study the types of machine tools and working principles of machine tools
 CO3: Apply principles of surface integrity in finishing processes and study gear manufacturing techniques
 CO4: Apply the manufacturing activities inter relation with computers for plant operations
 CO5: Apply the concept of Group Technology in computer aided manufacturing
 CO6: Apply system modeling tools in CIM and the fundamental concepts of data communications

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1. What are the characteristics of an ideal cutting tool material? CO1 [K₁]
2. Over the years, tool materials have been developed that have allowed significant increases in MRR. Nevertheless, HSS is still widely used. Under what conditions might HSS be the material of choice? CO1 [K₂]
3. How does a turret lathe differ from an engine lathe? CO2 [K₂]
4. The part shown in Figure 1 is to be machined from a rectangular blank. Suggest the type of operations required and their sequence. Also specify the machine tools that are needed. CO2 [K₂]

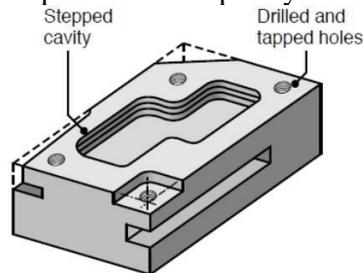


Figure 1

5. What are the advantages of gear hobbing? CO3 [K₁]
6. How a grinding wheel is selected? Discuss various factors that influence its selection? CO3 [K₂]
7. Specify any six major components of CNC machine tools. CO4 [K₁]
8. How does the structure of NC/CNC machine tools differ from conventional machine tools? CO4 [K₂]
9. Classify the automated production systems. CO5 [K₂]

10. What is meant by Group technology? CO6 [K₁]

**Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)**

11. Draw the Merchant's Circle diagram and derive the cutting forces during metal cutting. State the assumptions made in establishing the relationship among the various forces. 16 CO1 [K₃]

12. With schematic diagrams, explain the constructional features of a centre lathe and discuss the functions of each element in Lathe. Also list any six operations that can be performed on a Lathe? 16 CO2 [K₂]

13. Write the classification of gear cutting methods and explain the working of any one gear cutting process in detail. 16 CO3 [K₂]

14. Explain the following surface finishing operations with neat sketches: (i) Honing, (ii) Lapping, (iii) Super finishing, (iv) Polishing, and (v) Buffing 16 CO4 [K₃]

15. a) Discuss generative and variant type computer aided process planning (CAPP) approaches in detail. 10 CO5 [K₃]

b) List the benefits of group technology and discuss the types of group technology machine cells. 6 CO5 [K₂]

16. a) Discuss on nature and role of the elements of a CIM System. 10 CO6 [K₂]

b) Brief on island of automation and island of software. 6 CO6 [K₃]
