B.E. PRODUCTION ENGINEERING SECOND YEAR SECOND SEMESTER - 2023

SUBJECT : TECHNOLOGY OF MACHINING SYSTEMS

Time : Three hours **Full Marks 100**

Use a separate Answer-Script for each part
(50 marks for each part)

PART I (50 Marls)

Answers any four questions

1. (a) Draw the schematic arrangement and explain the Tumbler gear reversing mechanism elaborately.
   (b) Draw and explain the different rake angle? Why clearance angle is always positive?
   (6+3+1=10)
2. (a) What is up milling and down milling?
   (b) Determine the actual machining time Tc that will be required for plain milling a rectangular surface of length 200 mm and width 50 mm by a helical fluted plain HSS milling cutter diameter 70 mm, length 75 mm and 6 teeth. Assume A=O=5 mm, Vc= 44 m/min and So= 0.2 mm/tooth. **(4+6=10)**
3. (a) Write down the given specific term for grinding wheel specification:
   49-A-36-M-7-V-24
   (b) Elaborately explain different types of grinding operations using suitable diagram?
   (4+6=10)
4. Write down the short note: (a) All geared head box, (b) Apron mechanism.
   (5+5=10)
5. Draw the different view of the solid single point cutting tool for turning operation based on ASA system and define the tool nomenclature from the defined system.
   10
6. (a) Write down a short note about (i) Honing (ii) Lapping.
   (b) When turning a cylindrical work piece, two different tools are used. In one tool, no nose radius is provided, the side cutting and end cutting edge angles being 30° and 7°, respectively. In the other tool, a nose radius of 0.7 mm is provided. The feed used in both the cases is 0.125 mm. Find out the maximum height of unevenness in the generated surface. **(6+4=10=10)**

Ex/ PROD/PC/B/T/226/2023

B.E. PRODUCTION ENGINEERING SECOND YEAR SECOND SEMESTER - 2023

SUBJECT : TECHNOLOGY OF MACHINING SYSTEMS

Time : Three hours **Full Marks 100**

Use a separate Answer-Script for each part
(50 marks for each part)

No. of questions	PART- II Answer any five questions	Marks
1.	Show cross section of uncut chip and indicate uncut chip thickness on that figure. Establish the relation between uncut chip thickness (a1) and feed (f) using necessary figure.	7+3
2.	Show how shear angle (β) can be determined from the uncut chip thickness (a1), actual chip thickness (a2) and orthogonal rake angle (γ_0) of a single point cutting tool in metal cutting operation.	10
3.	Show all the forces acting on chip with the help of a neat sketch (F.B.D.) of a chip segment being in equilibrium under the action of several forces. Also show forces on tool exerted by chip.	6+4
4.	i) Show tool wear on face and flank surfaces with neat sketches. ii) Show the growth of flank wear with respect to time of machining. iii) Explain how tool life can be estimated from the tool wear information (indicate Tool Life on figure). iv) Show the growth of flank wear with respect to time of machining for various cutting speeds and describe how Taylor's Tool Life equation is derived from the flank wear growth information.	2+2+2+4
5.	Discuss about proper choice of cutting speed, feed and depth of cut in machining. Using suitable figures, show the effect of feed on surface finish of a job machined in a Lathe or Shaper,	8+2
6.	i) Show cutting velocity & direction of feed motion in cylindrical turning, facing, shaping & drilling. ii) Show rake angle & clearance angle with respect to cutting velocity vector, tool & job using a figure.	8+2