GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Fifth Semester Regular) Examinations, December – 2023

21BMEPC35003 – Manufacturing Science - II

(Mechanical)

Time: 3 hrs   Maximum: 70 Marks

Answer all questions
(The figures in the right hand margin indicate marks)

PART – A   (2 x 5 = 10 Marks)

Q.1. Answer *ALL* questions

		CO #	Blooms Level
a.	Explain the difference between the orthogonal cutting and oblique cutting.	CO1	K2
b.	Explain the conditions under which positive and negative rake angles are recommended.	CO1	K2
c.	With a neat sketch show the different parts of a drill bit.	CO2	K1
d.	State different types of indexing mechanism.	CO3	K1
e.	Outline the various types of energy sources used in non-traditional machining techniques?	CO4	K1

PART – B   (15 x 4 = 60 Marks)

Answer *ALL* questions

		Marks	CO #	Blooms Level
2. a.	In an orthogonal cutting operation, the following data have been observed: Uncut chip thickness = 0.127 mm, Width of cut = 6.35 mm, cutting speed = 2 m/s, Rake Angle = 10°, Cutting force = 567 N, thrust force = 227 N, Chip Thickness = 0.228 mm, Determine: shear angle, the friction angle, shear stress along the shear plane.	8	CO1	K4
b.	Show the merchant circle and express the normal and shear forces, cutting forces and thrust force relations.	7	CO1	K3

(OR)

		Marks	CO #	Blooms Level
c.	In an orthogonal cutting process, the following observations were made: Depth of cut = 0.25 mm; width of cut = 4 mm, chip thickness ratio = 0.45 cutting velocity = 40 m/ min cutting force parallel to the cutting vector = 1150 N cutting force component normal to cutting velocity vector = 140 N, rake angle =18°. Determine resultant cutting force. Shear plane angle, friction angle and force component parallel to shear plane	8	CO1	K4
d.	Discuss different types of tool materials with their important properties.	7	CO1	K2
3.a.	Outline the differences between engine lathe and capstan turret lathe.	7	CO2	K1
b.	Discuss different types of gear hobbing process with advantage and disadvantage.	8	CO2	K2

c.	Explain the various operation performed by lathe machine.	7	CO2	K1
d.	Describe different milling machine operations.	8	CO2	K2
4.a.	In a machining operation, when cutting speed was 50 m/min the tool life of 45 min was obtained. When cutting speed was increased to 100 m/min then tool life was obtained as 10min. If tool changing time is 2 min then determine optimum cutting speed for maximum productivity.	8	CO3	K3
b.	Explain crank and slotter quick return mechanism of shaper with a neat sketch.	7	CO3	K2

(OR)

c.	Outline the steps for indexing 69 numbers of divisions in milling machine by using compound indexing. The available index plate hole circles are as follows: Plate1: 15, 16, 17, 18, 19, 20; Plate 2: 21, 23, 27, 29, 31, 33; Plate 3: 37, 39, 41, 43, 47, 49	8	CO3	K4
d.	Describe the steps for thread cutting operation in lathe machine with a neat sketch.	7	CO3	K2
5.a.	Explain the working principle, and applications of EDM process with a neat sketch.	7	CO4	K2
b.	With a neat sketch explain the process of AJM? Discuss about the factors affecting quality of the machining.	8	CO4	K2

(OR)

c.	Briefly explain the effect of operating parameters on MRR. List the applications of USM.	7	CO4	K2
d.	Explain the principle of LBM with neat sketch and list out the advantages and disadvantages?	8	CO4	K2

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