Code No: R1631032 **R16** SET - 1

III B. Tech I Semester Supplementary Examinations, October/November - 2020

METAL CUTTING AND MACHINE TOOLS

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART – A (14 Marks)

1	a)	How does the rake angle affect the life of the cutting tool?	[2M]
	b)	Differentiate between Turret and Capstan lathes.	[2M]
	c)	How is drill sizes designated?	[2M]
	d)	Differentiate between up milling and down milling.	[2M]
	e)	What are the applications of super finishing operations?	[3M]
	f)	Give the complete classification of jigs?	[3M]

PART – B (56 Marks)

2	a)	In an orthogonal cutting experiment with a tool of rake angle $\alpha=7^0$, the chip thickness was found to be 2.5 mm when the uncut chip thickness was set to 1 mm. Find: i) the shear angle, β, ii) the friction angle γ, assuming that Merchant's formula holds good.	[7M]
	b)	Discuss briefly the following tool materials: i) High speed steels and ii) Cemented Carbides.	[7M]
3	a)	Explain in detail the single-spindle automatic lathe and compare it with multispindle automatic lathe.	[6M]
	b)	Explain briefly the following lathe operations: i) Facing ii) Threading iii) Knurling iv) Forming.	[8M]
4	a)	Sketch and describe any one quick return mechanism of shaper.	[7M]
	b)	Draw the block diagram of a slotting machine and explain briefly its principal parts.	[7M]
5	a)	Explain different types of indexing methods with example.	[7M]
	b)	Describe the different types of cutters used in milling operations and give an application of each type.	[7M]
6	a)	What is an abrasive? Explain briefly the following abrasives: i) Silicon Carbide ii) Aluminum Oxide.	[7M]
	b)	Explain the external centre less grinding process with sketch.	[7M]
7	a)	List out the essential characteristics required in the proper design of jigs and fixtures. Explain them.	[7M]
	b)	Explain the coordinate system used for vertical CNC milling machines.	[7M]

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