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

III B. Tech I Semester Regular Examinations, October/November - 2018

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

1.	a)	Determine the cutting speed and machining time per cut when the work having 40 mm diameter is rotated at 300 rpm. The feed given is 0.1mm/rev and length of cut is 65mm.	[2M]
	b)	Write a short note on four jaw independent chuck.	[2M]
	c)	How do you specify a Slotting machine?	[2M]
	d)	What is indexing head? What is importance in milling machine?	[3M]
	e)	How do you Specify a Grinding Wheel	[3M]
	f)	Write any two differences between jigs and fixtures.	[2M]

PART -B

2.	a)	Explain the nomenclature of single point cutting tool.	[7M]
	b)	Prove that : $\tan \emptyset = \frac{r \cos \alpha}{1 - r \sin \alpha}$	[7M]
3.	a)	How does the apron mechanism of a lathe works? Explain with the help of a neat diagram.	[7M]
	b)	How the sizes of Turret and Capstan lathes specified?	[7M]
4.	a)	What is a 'twist drill'? Make a neat sketch of it and show different parts on it.	[7M]
	b)	A C.I. plate measuring 300mm×100mm×40mm is to be rough shaped along its wider face. Calculate the machining time take approach = 25mm; over travel = 25mm; cutting speed = 12m/min; return speed = 20m/min; allowance on either side of the plate width = 5mm and feed per cycle = 1 mm.	[7M]
5.	a)	Sketch and describe a Vertical milling machine.	[7M]
	b)	Sketch and describe the following milling cutters. i) Slab milling ii) Face milling iii) Staggered teeth side mill.	[7M]
6.	a)	Write any seven advantages of center less grinding.	[7M]
	b)	Explain about reciprocating table type surface grinders.	[7M]
7.	a)	What are the essential factors will you consider while designing a jig or fixture.	[7M]
	b)	Explain the working principle of CNC machine with neat sketch.	[7M]

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Code No: R1631032 **R16** SET - 2

III B. Tech I Semester Regular Examinations, October/November - 2018

METAL CUTTING AND MACHINE TOOLS

(Mechanical Engineering)

Time: 3 hours Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	Determine the cutting speed and machining time per cut when the work having 25 mm diameter is rotated at 225 rpm. The feed given is 0.2mm/rev and length of cut is 55mm.	[2M]
	b)	Write a short note on angle plate used in lathe.	[2M]
	c)	How do you specify a Planning machine?	[2M]
	d)	Write any three differences between end milling and face milling.	[3M]
	e)	What are the natural abrasives used in grinding? Explain.	[3M]
	f)	Write the fundamental principles of jigs and fixtures.	[2M]

PART -B

2.	a)	How is tool life influenced by the following factors? i) Tool material ii) Workpiece material iii) Rigidity of the machine tool (iv) Use of cutting fluids.	[8M]
	b)	List the common methods of chip breaking and what are the means used for the same.	[6M]
3.	a)	Write any four operations that can be performed on a lathe machine with diagrams.	[8M]
	b)	What is a turret saddle? Describe its function in brief.	[6M]
4.	a)	What is jig boring machine? With the help of a block diagram, describe the main features of a boring machine.	[7M]
	b)	How slotting machine is specified and write the main parts of a slotting machine.	[7M]
5.	a)	Sketch and describe a Universal milling machine.	[7M]
	b)	Write a short note on the following milling operations. i) End milling ii) Profile milling and iii) Gang milling.	[7M]
6.	a)	Write a short note on rotary table type surface grinder.	[7M]
	b)	Why 'trueing' and 'dressing' are necessary in grinding wheels? Describe a few methods dressing an abrasive wheel.	[7M]
7.	a)	What is the principle of 'six point location '? Explain.	[7M]
	b)	Write any seven applications of CNC machines.	[7M]

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Code No: R1631032 **R16** SET - 3

III B. Tech I Semester Regular Examinations, October/November - 2018

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

1.	a)	Determine the cutting speed and machining time per cut when the work having 45 mm diameter is rotated at 350 rpm. The feed given is 0.18 mm/rev and length of cut is 75mm.	[2M]
	b)	Write a short note on Carriers or Dogs used in a lathe machine.	[2M]
	c)	How do you specify a Shaping machine?	[2M]
	d)	Explain slot milling operation with a diagram.	[3M]
	e)	What is super finishing? Write any three features of it.	[3M]
	f)	Write the essential features of jigs and fixtures.	[2M]

PART -B

2.		Draw Merchant's Circle Diagram and derive expressions to show the relationships among the different forces acting on a cutting tool and different parameters involved in metal cutting.	[14M]
3.	a)	Explain taper turning by tail stock set over method with a neat diagram.	[7M]
	b)	Describe a single spindle bar automatic lathe in detail.	[7M]
4.	a)	What are the common operations that can be performed on a drilling machine? Explain any four of them with neat diagrams.	[7M]
	b)	Explain the working of a hydraulic quick return mechanism of a shaper.	[7M]
5.	a)	Sketch and describe about a Horizontal milling machine.	[8M]
	b)	Explain the working of a 'Universal dividing head 'with a diagram.	[6M]
6.	a)	What is the use of cylindrical grinders? Explain the principle of cylindrical grinding.	[7M]
	b)	Write short notes on i) lapping ii) Honing.	[7M]
7.	a)	What are the different types of locating pins you know? Illustrate and explain their uses.	[7M]
	b)	Explain about the construction features of CNC machine.	[7M]

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Code No: R1631032 **R16** SET - 4

III B. Tech I Semester Regular Examinations, October/November - 2018

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

1.	a)	Determine the cutting speed and machining time per cut when the work having 50 mm diameter is rotated at 400 rpm. The feed given is 0.2mm/rev and length of cut is 60mm.	[2M]
	b)	Write a short note on mandrels used as a lathe accessory.	[2M]
	c)	How do you specify a Boring machine?	[2M]
	d)	Write any three merits of indexing method in milling machine.	[3M]
	e)	Write any three differences between honing and lapping.	[3M]
	f)	What are the different materials used for jigs and fixtures? Explain the importance of any one material.	[2M]

PART -B

2.	a)	In an orthogonal turning operation on a lathe the following data were obtained Cutting speed = 120m/min; Diameter of work piece = 100mm; cutting force = 180kg; Feed force = 60kg; Back rake angle = 10^0; Feed rate = 0.3mm/rev; Chip thickness = 0.4mm; Depth of cut = 0.3mm. Calculate chip thickness ratio, shear plane angle, coefficient of friction, friction angle, shear stress, shear strain, strain energy and chip flow thickness.	[10M]
	b)	What are 'Crater wear' and 'Flank wear'? Explain.	[4M]
3.	a)	What are multi – spindle automatic machines and how do you classify them.	[7M]
	b)	Explain taper turning by taper turning attachment method with a neat diagram.	[7M]
4.	a)	What is Jig boring machine? Describe its construction and working in detail.	[7M]
	b)	Explain the working of a slotted disc mechanism for driving the ram of a slotting machine.	[7M]
5.	a)	What is the working principle involved in a milling operation. How are they classified?	[6M]
	b)	Explain and solve how to make 51 divisions on a work piece by using compound indexing method.	[8M]
6.	a)	What is lapping? How is it done? How many types of lapping operations are there? Explain.	[7M]
	b)	What are the different types of bonds used in the manufacture of abrasive wheels? Explain.	[7M]
7.	a)	What are the basic principles involved in designing a clamping device for a jig or fixture.	[7M]
	b)	Explain about different types of motion controls in CNC machines.	[7M]

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