Q. Code:426344

Reg.No.

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2024

Sixth - Semester

ME18014 – DIGITAL MANUFACTURING

(Mechanical Engineering)

(Regulation 2018/2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	The students will be able to learn basic concepts of NC, CNC machines and adaptive control system.	**2**
CO 2	The students will be exposed to different Mechatronics and Mechanical elements in CNC machines.	**2**
CO 3	The students will be able study different CNC measuring system and tooling.	**2**
CO 4	The students will be able to practice CNC programming	**3**
CO 5	The students will be able to study the maintenance of different CNC machine elements.	**2**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

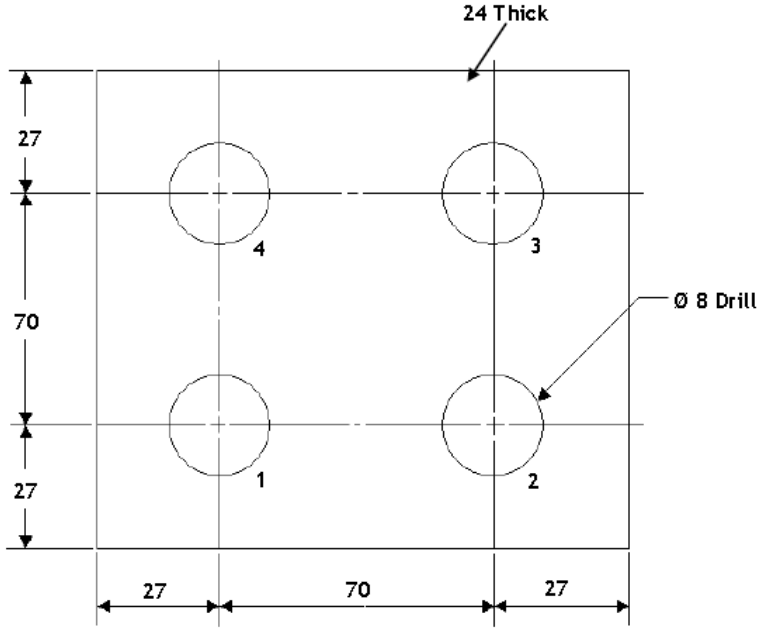
		CO	RBT LEVEL
1	Why is digital manufacturing important?	**1**	**4**
2	Provide examples of machine tools for different degree of automation.	**1**	**1**
3	Define PLC.	**2**	**1**
4	What are the types of loads that act on machine structure and their elements?	**2**	**2**
5	How do automatic tool changers and automatic pallet changers differ in functionalities and purposes in CNC machining centers?	**3**	**4**
6	How would you define a tool magazine in the context of CNC machining?	**3**	**2**
7	Under what circumstances would you use Do Loops and Sub-routine?	**4**	**3**
8	What are the differences between linear interpolation and circular interpolation?	**4**	**4**
9	Name two machine elements considering their electrical and hydraulic aspects.	**5**	**1**
10	What is involved in CNC control system?	**5**	**2**

PART- B (5 x 14 = 70 Marks)

			Marks	CO	RBT LEVEL
11. (a)	**(i)**	How do the interactions between the basic components of an NC system impact its overall performance?	**(7)**	**1**	**3**
	(ii)	How is the configuration of an adaptive control system designed within an NC system?	**(7)**	**1**	**3**
		(OR)			
(b)	**(i)**	How are the functions of a DNC system implemented within a	**(7)**	**1**	**3**

manufacturing environment?

	(ii)	How can the configuration of a DNC system be tailored to suit specific manufacturing requirements?	**(7)**	**1**	**3**
12. (a)		How does the configuration of a CNC system influence precision, speed, and versatility in modern manufacturing processes?	**(14)**	**2**	**3**
		(OR)			
(b)	**(i)**	How do different types of load impact the design and construction of machine structures?	**(7)**	**2**	**3**
	(ii)	Explain the fundamental components comprising mechanical power transmission systems.	**(7)**	**2**	**3**
13. (a)	**(i)**	Explain about the different feedback devices employed in CNC systems.	**(7)**	**3**	**3**
	(ii)	Discuss the different classifications of cutting tools based on their settings.	**(7)**	**3**	**3**
		(OR)			
(b)	**(i)**	What are the different types of fixtures commonly utilized in CNC machine tools?	**(7)**	**3**	**3**
	(ii)	Explain the categories of Tool Condition Monitoring (TCM) implemented in CNC machine tool.	**(7)**	**3**	**3**
14. (a)		The component is to be machined and drilled as per the diagram shown below. Develop the part program with the use of canned cycle.	**(14)**	**4**	**4**

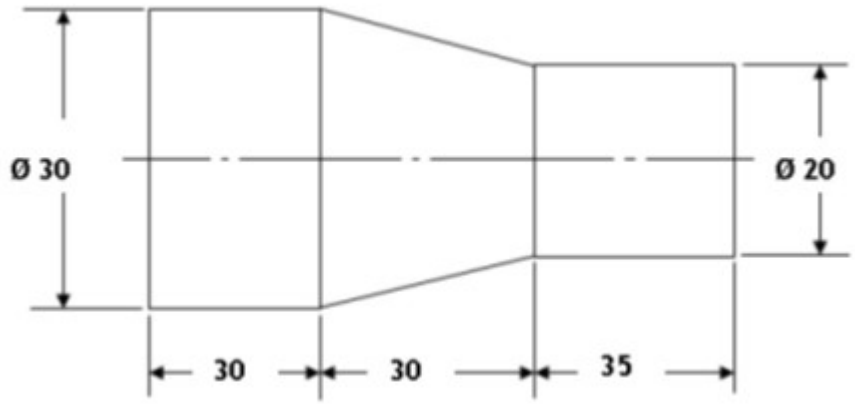


All dimensions are in mm

(OR)

(b)	Write a CNC part programme for machining in a CNC turning centre for the component shown in the picture.	**(14)**	**4**	**4**

(All dimensions are in mm).



15. (a)	**(i)**	List out the technical specifications of the CNC machine tool that is available in the machine shop.	**(7)**	**5**	**3**
	(ii)	What are the Common problems that occur during the CNC machine tool installation?	**(7)**	**5**	**3**

(OR)

(b)	**(i)**	What are the ways to detect the positional accuracy in the CNC machine tool?	**(7)**	**5**	**3**
	(ii)	What are the key considerations and steps involved in the installation process of a CNC machine?	**(7)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

			Marks	CO	RBT LEVEL
16.	Discuss the possibilities of updating the existing facilities available in SVCE mechanical engineering department for product design, machining and measurement to introduce digital manufacturing concept.		**(10)**	**3**	**5**

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