PRN:		Course Code :	MET2502

Third Year **B. Tech** End Semester Examination Summer 2023

Mechanics of Metal Cutting and Tool Design

Day and Date: Friday, 01/12/2023 Max Marks: **100**

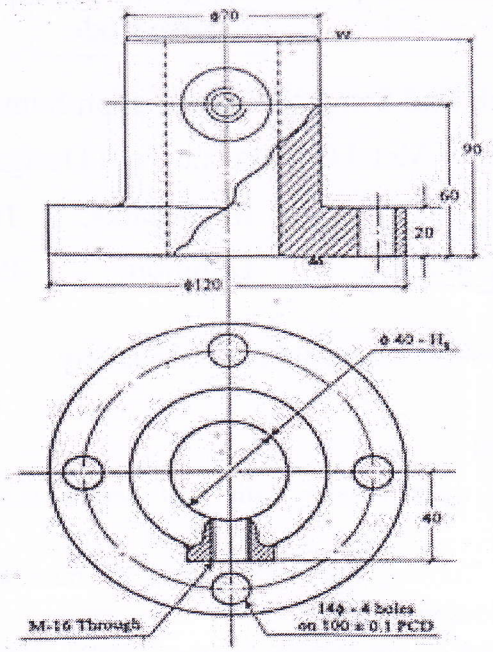
Time : 10.30am to 2.30 PM Duration: **04** hrs

Instructions: All questions are compulsory.

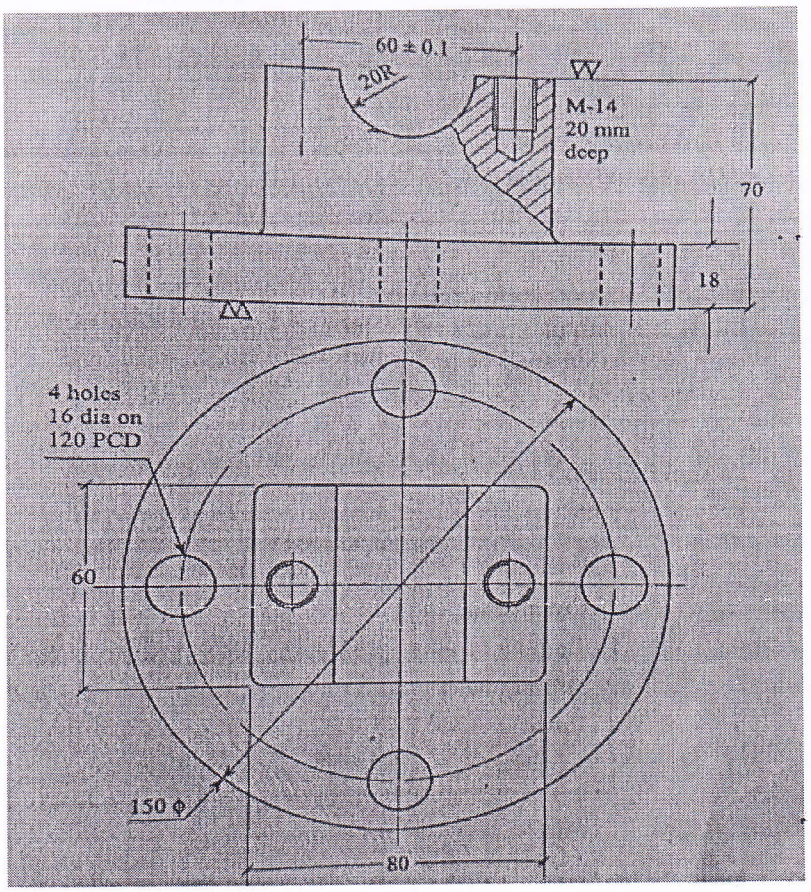
			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	Elaborate the Tool dynamometer with neat sketch and its applications.	08	3	1
	b)	In an Orthogonal Turning test with a tool of rake angle 10^{o}.These observations were made: Horizontal component of the cutting force = 1200N, Vertical component of the cutting force = 1600N, From merchant circle calculate the various components of the cutting forces ,shear stress and the coefficient of fraction at the chip tool interface.	08	3	1
		OR			
	b)	Describe various types of chips formed during metal cutting.	08	2	1
Q.2		**Attempt the following**			
	a)	Elaborate the twist drill with sketch and applications.	08	2	2
	b)	Illustrate the nomenclature of single point cutting tool with suitable sketch.	08	2	2
		OR			
	b)	Explain different tool coating methods.	08	1	2
Q.3		**Attempt any two from the following**			
	a)	Illustrate the tool materials are used in metal cutting? Discuss their importance in machining.	08	3	3
	b)	Enumerate the types of cutting fluid and mention the composition and applications of any three types.	08	3	3
	c)	Elaborate the factors affecting machinability and explain them	08	2	3
Q.4		**Attempt any two from the following**			
	a)	Demonstrate the 3:2:1 principle for any suitable simple component.	08	3	4
	b)	Illustrate the different types of locators with their applications.	08	2	4
	c)	Elaborate the hydraulic clamping with neat sketch and its applications.	08	2	4
Q.5		**Attempt any Two of the following**			
	a)	Design and draw any two views of a Jig for producing one M-16 holes at the component shown in figure. Draw type of jig, jig plate and jig bush for the component Draw F.V and T.V with suitable scale.	09	4	4

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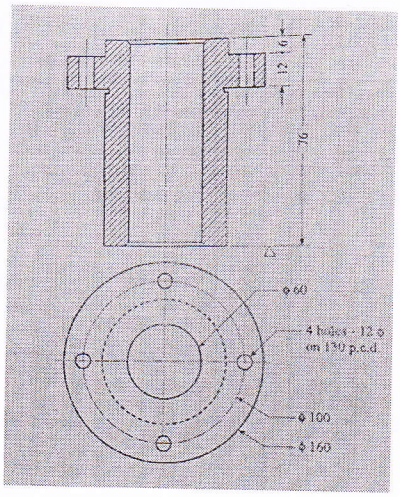
b) Design and draw a jig for 2 holes M-14 at 60+-0.1mmC.D as shown in Fig.1. Draw type of jig, jig plate and jig bush for the component Draw F.V and T.V with suitable scale. 09 4 4



c) 09 4 4

Design and draw the milling fixture to face mill diameter 100mm as shown in fig.1. Show locating part, clamping component and

setting block with dimensions. Draw F.V and T.V with suitable scale. All dimensions are in mm.



Q.6 **Attempt any Two of the following**

a) A washer with 12.7mm internal hole and 25.4mm outer hole is to be made from 1.5mm thick strip of 0.2% carbon steel. Considering the elastic recovery of the material, Find; 1) clearance 2) Blanking Die opening size 3) Blanking punch size 4) Piercing punch size 5) piercing die opening size. — 09 — 3 — 5

b) Justify that, "How would you compare between compound die set and progressive die set on the basis of working and application?" — 09 — 2 — 5

c) Explain with neat sketch the following; — 09 — 1 — 5

1. Cutting force in blanking.
2. Punch and die clearance.

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