UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: DTD 2013
COURSE	: PRESS TOOL DESIGN
SEMESTER/SESSION	: 1-2023/2024
DURATION	: 6 HOURS

Instructions:

1. This booklet contains ONLY 1 question.
2. All answers should be done using AutoCAD software and save in thumb drive except for the calculation need to be answered in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 7 PRINTED PAGES INCLUDING COVER PAGE

Instruction:

Refer to PME standard and Appendix 1. The standard screw design and title block are available in your desktop. Submit your answer with thumb drive provided. Save your drawing as your Metric No. and workstation for example: *A07A01000_FINAL2023_WS01*. For back-up, save in the desktop of your computer.

QUESTION

Figure PT1 shows the component which is required to produce in your company. You are required to ***calculate*** and ***designing*** the "**Progressive Tool**" according the following factors using **"direct piloting"**:

1. Suggested press tool operations: Piercing, piloting and blanking.

2. **Calculate** the following items:
   i. Economic Factor (5 marks)
   ii. Cutting Force (10 marks)
   iii. Machine Tonnage (5 marks)
   iv. Cutting Clearance (5 marks)

3. **Produce** drawings for:
   i. Component design. (3 marks)
   ii. Draw sectional assembly view (Front and side view) (15 marks)
   iii. Plan view of lower assembly (Die) (10 marks)
   iv. Plan view of upper assembly (punch) (10 marks)

4. **Produce** the detail of:
   i. Produce strip layout in wide-run (12 marks)
   ii. Piercing punch (5 marks)
   iii. Blanking punch (5 marks)
   iv. Die plate (10 marks)
   v. Bill of materials (5 marks)

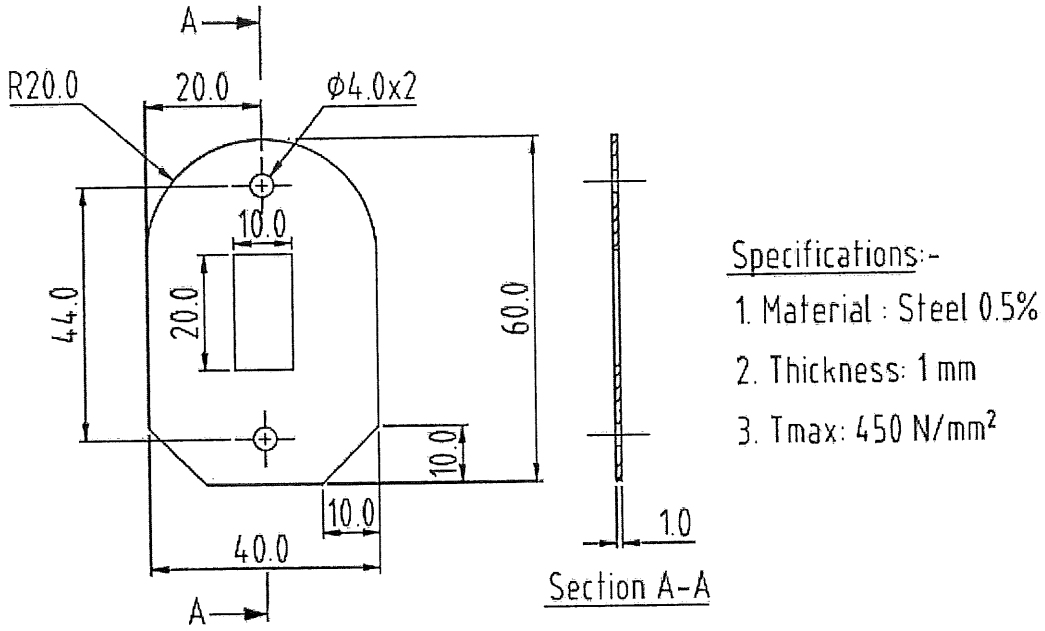

Figure: PT 1 Bracket

----------End of question----------

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Criteria	Marks
All question answered will be marked according to the answer schema	/100

APPENDIX 1

Side Scrap and Scrap bridge

Sheet Thickness (mm)	Strip Width (mm)			
	Up to 10	10 - 50	50 - 100	100 - 150
0.5	1.5	2.0	3.0	3.5
1.0	1.0	1.75	2.0	2.5
1.5	1.5	2.0	2.5	3.0
2.0	2.0	2.5	3.0	3.5
3.0	2.0	3.5	4.0	4.5

Economic Factor

$$\text{E.F} = \frac{\text{Area of component x No. of Row x 100}}{\text{Width of Strip x pitch}}$$

Cutting/Shearing Force, F

Cutting/Shearing Force, F $= l \times s \times \tau_{max}$

where, l = length of periphery to be cut in mm
s = stock thickness in mm
τ_{max} = shear strength in N/mm^2

Cutting Clearance for sheet thickness up to 3 mm

Clearance (*for one side*) $= C \times s \times \sqrt{\left(\tau_{max}/10\right)}$

Cutting Clearance for sheet thickness above 3 mm

Clearance (*for one side*) $= \left(1.5 \times C \times s - 0.015\right) \times \sqrt{\left(\tau_{max}/10\right)}$

where, C = a constant = 0.01
s = stock thickness in mm
τ_{max} = shear strength in N/mm^2

General guideline for plate thickness

Thrust plate = 0.4 t_d
Stripper plate = 0.5 t_d
Punch holder plate = 0.75 t_d
Top plate = 1.5 t_d
Bottom plate = 1.75 t_d

Note:
t_d = die thickness

General Guideline for Die Block Thickness

The following table has been found quite satisfactory to enable an initial selection of proper die block thickness.

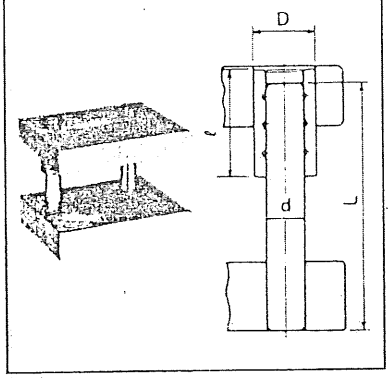
Stock Material thickness in mm	Die block length up to 125mm	Die block length 125 to 200mm	Die block length 200 to 400mm
Up to 1 mm	16	20	24
1 to 2mm	20	24	28
2 to 3	24	29	32
3 to 4	28	32	36
4 to 6	32	36	50
6 mm and above	36	40	60

----------End of question----------

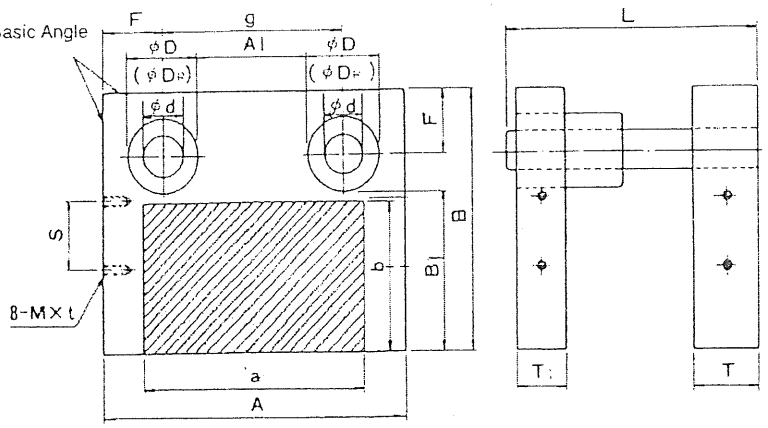
B TYPE STEEL DIE SET

POST TYPE

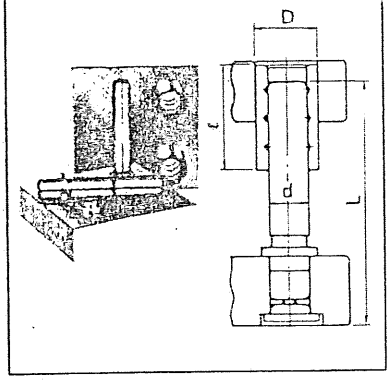
BO Standard Type



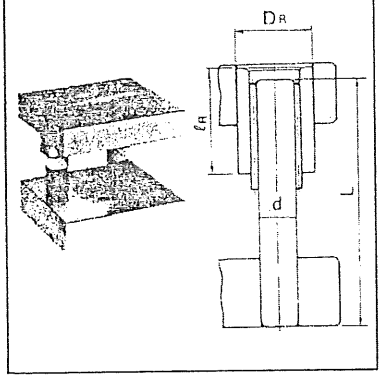
Basic Angle



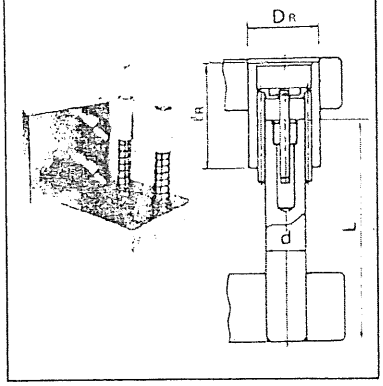
BS Demountable Type



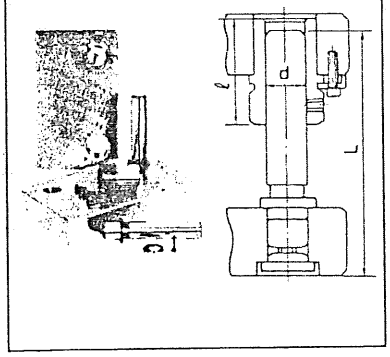
RO Ball Guide Type



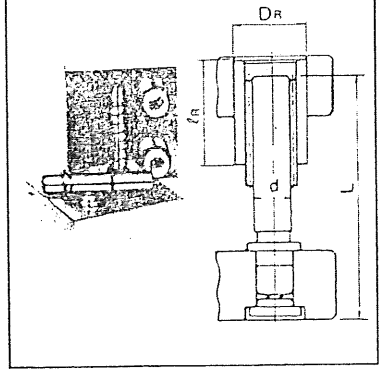
RT Ball Retainer Type



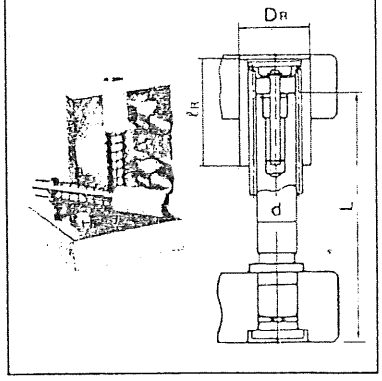
BM Demountable Pin & Bush



RS Demountable Ball Guide Type



RY Demountable Ball Retainer Type



WHEN ORDERING PLEASE SPECIFY AS FOLLOWS:

S	B	RT	400x250	X	180	-	1
Standard Steel Die Set	Type Of Holder	Type Of Guide Post	Dimension		Guide Post Length (L)		Quantity

B TYPE STEEL DIE SET

THE HOLDER DIMENSIONS ARE COMMON TO ALL TYPES OF GUIDES
UNLESS OTHER WISE SPECIFIED, THE L DIMENSION GIVEN BELOW IS USED, IF OTHER DIMENSIONS ARE DESIRED. SELECT & SPECIFY THEN FROM THE "PART" SECTION OF THIS CATALOG.

NO	Dimension axb		A	B	B1	A1	F	g	M x t	S	WEIGH kg	T	T1	d	D	DR	ℓ	ℓR	L
1	100		140	140	86	32	34	72	-	-	11								
2	125		170	140	86	62	34	102	-	-	13	36	28	20	31	37	60	60	140
3	160	80	200	140	86	92	34	132	-	-	15								
4	200		250	150	86	122	40	170	-	-	22	40	32	25	37	44	67	75	150
5	250		300	150	86	172	40	220	-	-	27								
6	100		140	160	106	32	34	72	-	-	12	36	28	20	31	37	60	60	140
7	125		170	160	106	62	34	102	-	-	14								
8	160	100	212	170	106	84	40	132	-	-	22								
9	200		250	170	106	122	40	170	-	-	25								
10	250		300	170	106	172	40	220	-	-	30								
11	125		180	190	126	52	40	100	-	-	19								
12	160	125	212	190	126	84	40	132	-	-	24	40	32	25	37	44	67	75	150
13	200		250	190	126	122	40	170	-	-	27								
14	250		300	190	126	172	40	220	-	-	33								
15	160		212	224	160	84	40	132	-	-	27								
16	200		250	224	160	122	40	170	-	-	33								
17	250	160	315	250	173	161	48	219	M12 x 25	80	57								
18	315		400	250	173	246	48	304	"	80	72								
19	355		425	250	173	271	48	329	"	80	76								
20	200		265	280	203	111	48	169	"	110	54								
21	250		315	280	203	161	48	219	"	110	63	50	40	38	51	63	80	95	160
22	315	200	400	280	203	146	48	304	"	110	81								
23	355		425	280	203	271	48	329	"	110	85								
24	400		475	280	203	321	48	379	"	110	95								
25	450		530	300	207	344	56	418	"	100	128	56	45	45	63	74	85	95	180
26	250		315	335	258	161	48	219	"	165	76								
27	315		400	335	258	246	48	304	"	165	96	50	40	38	51	63	80	95	160
28	355	250	425	335	258	271	48	329	"	165	102								
29	400		475	355	262	289	56	363	"	155	135								
30	450		530	355	262	344	56	418	"	155	151								
31	500		600	355	262	414	56	488	"	155	171								
32	315		400	425	332	214	56	288	"	225	137								
33	355		450	425	332	264	56	338	"	225	153	56	45	45	63	74	85	95	180
34	400	315	475	425	332	289	56	363	"	225	162								
35	450		530	425	332	344	56	418	"	225	180								
36	500		600	425	332	414	56	488	M16 x 30	225	204								
37	560		670	425	319	459	63	544	"	175	255	63	50	50	68	78	95	106	210
38	355		450	450	357	264	56	338	M12 x 25	250	162								
39	400		475	450	357	289	56	363	"	250	171	56	45	45	63	74	85	95	180
40	450	355	530	450	357	344	56	418	"	250	191								
41	500		600	475	369	389	63	474	M16 x 30	225	225	63	50	50	68	78	95	106	210
42	560		670	475	369	459	63	544	"	225	285								