Name _____ ID _____ Seat No. _____

KING MONGKUT'S UNIVERSITY OF TECHNOLOGY THONBURI

Final Examination

First semester, Academic Year 2007

TEN 132 Tool Drawing II — Tool Engineering (Bilingual)

Tuesday 16 October 2007 — Time : 9:00 – 12:00

Instructions :

1. This examination paper contains 5 problems 9 pages including this page. (total of 40 marks)
2. Closed book examination, books are not allowed.
3. Calculator and drawing instruments are allowed.
4. Table of 1 page is provided within the paper.

Dr.Varunee Premanond (Ext. 9209)

Instructor

This examination paper has been evaluated from Tool and Materials Engineering Department

(Assoc.Prof.Dilok Sriprapai)

Head of Department

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1. The picture in the left column indicate the weld cross section required. **Complete the picture in the right column** to represent welding symbol as shown. (12 marks)

SAMPLE

DESIRED WELD SYMBOL

1.1

DESIRED WELD SYMBOL

1.2

DESIRED WELD SYMBOL

1.3

DESIRED WELD SYMBOL

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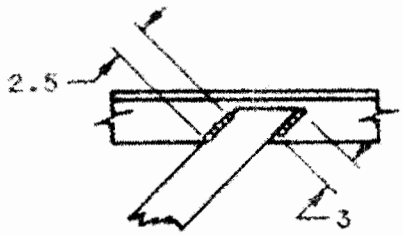
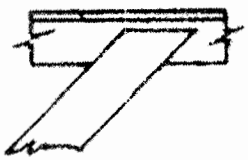
1.4

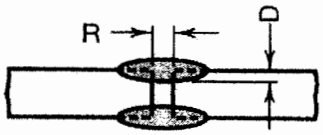


DESIRED WELD

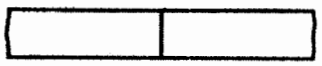


SYMBOL

1.5



DESIRED WELD



SYMBOL

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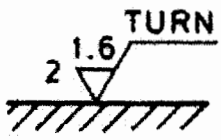
2. Explain the meaning of the following symbols; (6 Marks)

2.1



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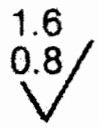
2.2



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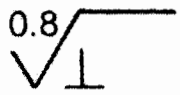
2.3



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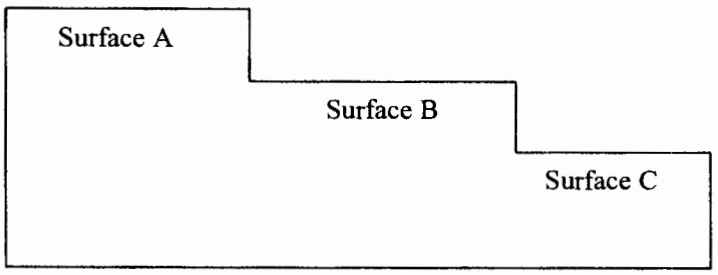
3. Apply surface roughness symbol to indicate the following surface (6 Marks)

3.1 Surface A – remain as found from the last process and no material to be removed

3.2 Surface B – A machined surface (milling operation) roughness value of less than 3.2 μ with a circular relative to the center of surface direction.

3.3 Surface C – The surface can be prepared by any method with roughness value within a range of 0.6 to 4.2 μm.



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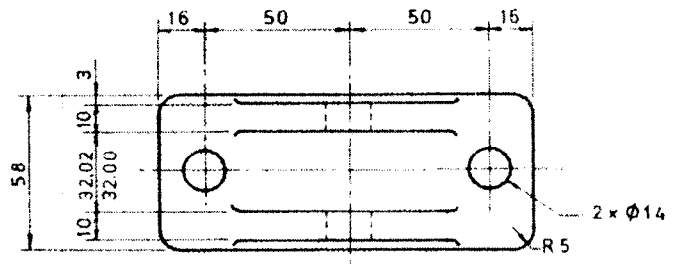
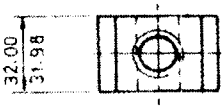
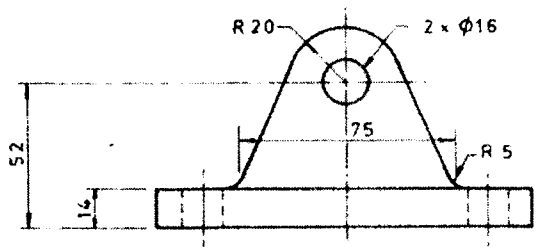
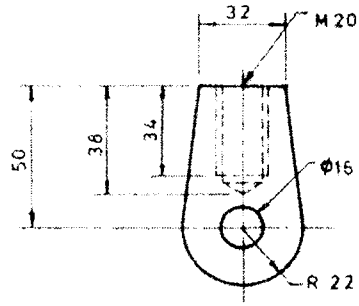
4. Details of the component parts of a machinist's jack are given. Draw or sketch the general assembly views on a standard sheet (next page). Complete the title block and part lists block. (20 marks)





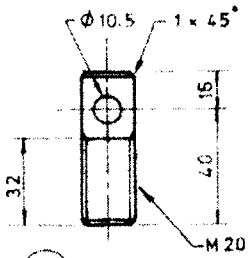


1 BASE
(MS – 1 REQD)

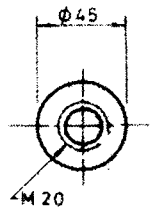


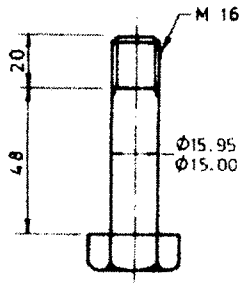
2 SWIVEL
(M S – 1 REQD)

4 STANDARD NUT
(MS – 1 REQD)



5 SCREW
(MS – 1 REQD)





3 BOLT
(MS – 1 REQD)

TOLERANCES
±0.5 EXCEPT
AS STATED

6 LOCK NUT
(MS – 1 REQD)

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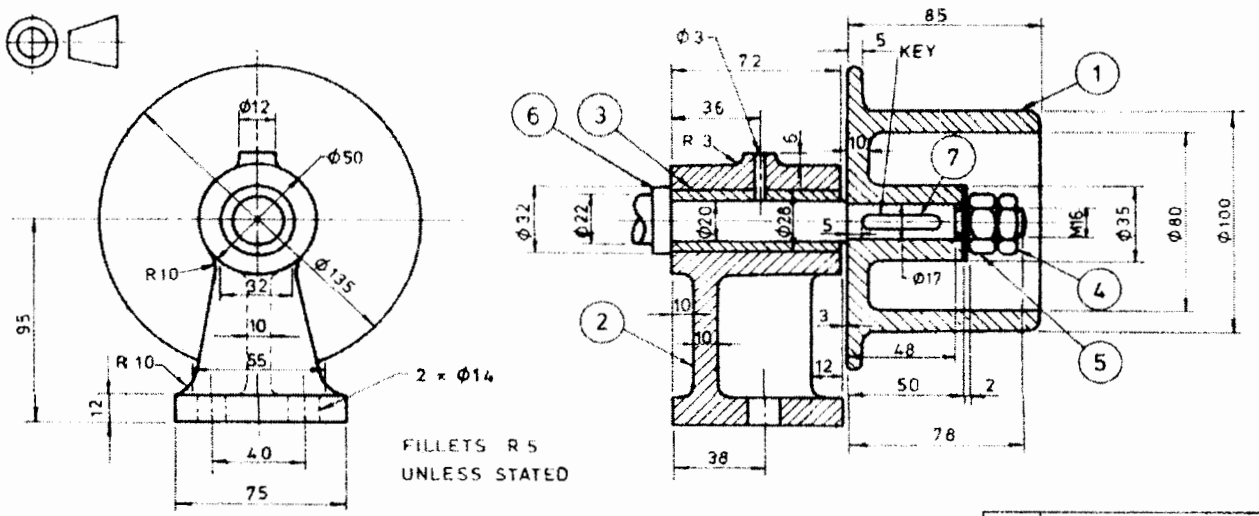
5. Assembly drawing of pulley and shaft is given below. Answer the following question?
(6 Marks)



ITEM	DESCRIPTION
7	KEY
6	SHAFT
5	LOCKNUT
4	NUT
3	BUSH
2	BRACKET
1	PULLEY

5.1 What is the proper size of key (number 7) _____ mm x mm

5.2 What is the standard pitch of Nut number 4 _____ mm

5.3 Which process should be selected to produce key seat on the shaft? (Tick the appropriate box)

- ☐ Horizontal milling
- ☐ Vertical milling
- ☐ Broaching

Name _____ ID _____ Seat No. _____

Table

TABLE 1.8 ▶ Dimensions and tolerances for square parallel keyways

All dimensions in millimetres. As amended (Jul) 1991

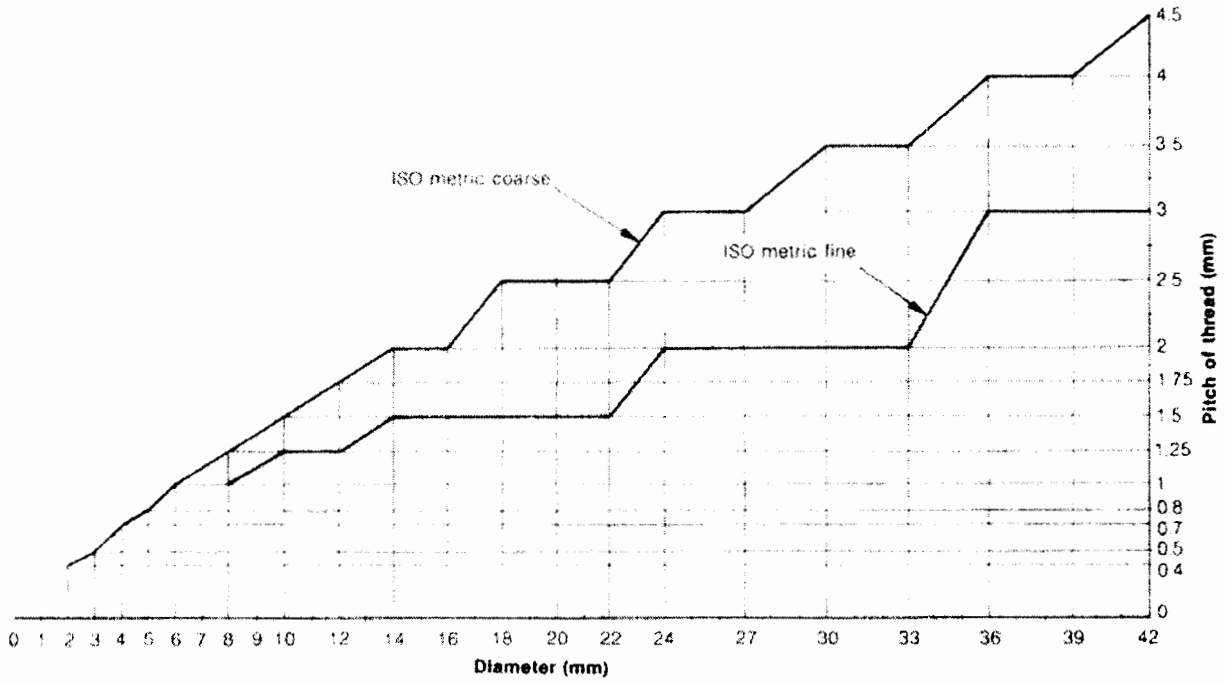
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SHAFT		KEY (see Note)	KEYWAY											
NOMINAL DIAMETER *d* (see Note)		SECTION *b* x *h* WIDTH x THICKNESS	WIDTH *b*						DEPTH				RADIUS *r*	
			TOLERANCE FOR CLASS OF FIT						SHAFT t_1		HUB t_2			
OVER	INCL.		NOM.	FREE		NORMAL		CLOSE AND INTERFERENCE	NOM.	TOL.	NOM.	TOL.	MAX.	MIN.
				SHAFT (*H*9)	HUB (D10)	SHAFT (N9)	HUB (J_S9)*	SHAFT AND HUB (P9)						
6	8	2 x 2	2	+ 0.025	+0.060	−0.004	+0.012	−0.006	1.2		1		0.16	0.08
8	10	3 x 3	3	0	+0.020	−0.029	−0.012	−0.031	1.8		1.4		0.16	0.08
10	12	4 x 4	4						2.5	+0.1 0	1.8	+0.1 0	0.16	0.08
12	17	5 x 5	5	+0.030 0	+0.078 +0.030	0 0.030	+0.015 −0.015	−0.012 −0.042	3		2.3		0.25	0.16
17	22	6 x 6	6						3.5		2.8		0.25	0.16

TABLE 1.9 ▶ Dimensions and tolerances for rectangular parallel keyways

All dimensions in millimetres

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SHAFT		KEY (see Note)	KEYWAY											
NOMINAL DIAMETER *d* (see Note)		SECTION *b* x *h* WIDTH x THICKNESS	WIDTH *b*						DEPTH				RADIUS *r*	
			TOLERANCE FOR CLASS OF FIT						SHAFT t_1		HUB t_2			
OVER	INCL.		NOM.	FREE		NORMAL		CLOSE AND INTERFERENCE	NOM.	TOL.	NOM.	TOL.	MAX.	MIN.
				SHAFT (*H*9)	HUB (D10)	SHAFT (N9)	HUB (J_S9)*	SHAFT AND HUB (P9)						
22	30	8 x 7	8	+0.036	+0.098	0	+0.018	−0.015	4		3.3		0.25	0.15
30	38	10 x 8	10	0	+0.040	−0.036	−0.018	−0.051	5		3.3		0.40	0.25
38	44	12 x 8	12						5		3.3		0.40	0.25
44	50	14 x 9	14	+0.043	+0.120	0	+0.021	−0.018	5.5		3.8		0.40	0.25
50	58	16 x 10	16	0	+0.050	−0.043	−0.021	−0.061	6	+0.2	4.3	+0.2	0.40	0.25
58	65	18 x 11	18						7	0	4.4	0	0.40	0.25
65	75	20 x 12	20						7.5		4.9		0.60	0.40
75	85	22 x 14	22	+0.052	+0.149	0	+0.026	−0.022	9		5.4		0.60	0.40
85	95	25 x 14	25	0	+0.065	−0.052	−0.026	−0.074	9		5.4		0.60	0.40
95	110	28 x 16	28						10		6.4		0.60	0.40
110	130	32 x 18	32						11		7.4		0.60	0.40
130	150	36 x 20	36						12		8.4		1.00	0.70
150	170	40 x 22	40	+0.062	+0.180	0	+0.031	−0.026	13		9.4		1.00	0.70
170	200	45 x 25	45	0	+0.080	−0.062	−0.031	−0.088	15		10.4		1.00	0.70
200	230	50 x 28	50						17		11.4		1.00	0.70
230	260	56 x 32	56						20	+0.3	12.4	+0.3	1.60	1.20
260	290	63 x 32	63	+0.074	+0.220	0	+0.037	−0.032	20	0	12.4	0	1.60	1.20
290	330	70 x 36	70	0	+0.100	−0.074	−0.037	−0.106	22		14.4		1.60	1.20
330	380	80 x 40	80						25		15.4		2.50	2.00
380	440	90 x 45	90	+0.087	+0.260	0	+0.043	−0.037	28		17.4		2.50	2.00
440	500	100 x 50	100	0	+0.120	−0.087	−0.043	−0.124	31		19.5		2.50	2.00

Name _____ ID _____ Seat No. _____



Graphical comparison of metric thread